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THE PUBLICATION FOR LIGHTWAVE AND CINEMA 4D ENTHUSIASTS

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1-888-778-WAVE

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**Printer**
Ries Graphics Ltd., Butler WI
Specializing in short to medium run publications and other commercial printing.
262-781-5720 or www.riesgraphics.com

**The Secret Formula**
Keyframe Magazine is created using Quark 4.1, Photoshop 6.0, LightWave 7.0, and various plug-ins.

No dongles were harmed (much) in the making of this publication.

Happy Birthday, Rosalee Faye

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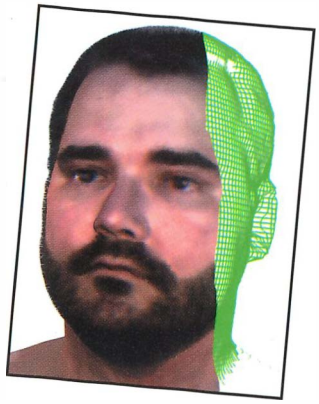
# EDITORIAL



**"Happiness lies in being privileged to work hard for long hours in doing whatever you think is worth doing." — Robert A. Heinlein**

If VFX artists aren't nuts, why do we work the way we do?

We work incredibly long hours. I don't know anyone working in VFX who puts in a standard 40-hour week. When deadlines loom and the entire studio is in crunch mode, working over a hundred hours a week is not unheard of.

We sacrifice our personal and family time. How many of us have strained relationships because of our work habits? The jokes about not marrying 'unbelievers' have more than a grain of truth to them; it's difficult to convince anyone who hasn't worked in this industry that the long hours and obsessive behaviors are necessary. Personal relationships are easier with those who are just as obsessive about their own careers or art forms.

As for family, your ability to coexist peaceably depends largely on what they are used to. If they're all buttoned-down clock-punchers, you have little hope of explaining yourself; just get used to bad looks when you excuse yourself from family gatherings in order to work. If you come from a long line of obsessive artists, you may be lucky enough to be seen as carrying on the family tradition.

We destroy our bodies, patiently and consistently eroding our health and well-being. We ingest caffeine in amounts that would defibrillate a horse. We repetitively move our wrists in unnatural patterns that inflame our tissues and numb and cripple our hands. We continue to work through the pain, aggravating our injuries. We sit in the dark and stare, unblinking, at monitors for entire days at a stretch.

There are no full-career retirees from digital VFX yet, because our industry hasn't been around long enough. The oldest members of our curious tribe hail from just about every other industry imaginable. The very youngest apprentices have been born since the start of the digital age, but they have no mature role models to follow. If we look to traditional animation for elder role models, the only pattern we see is "Animate until you die." Being found slumped over your workstation would seem a sad way to go for most people, but we seem to plan on it — or at least, not to plan for any other ending.

We also choose to stay on the treadmill. With so many changes to our tools happening at such a rapid pace, it's necessary to continuously learn and relearn our art. If we slack off for a moment, there's a pack of eager 13-year-olds lusting after your job. Keep up your chops, or get the chop.

So why do we do this? It's not the money; the going rate for VFX artists isn't anywhere near what a J.D. or M.B.A. would bring in for the same level of experience and effort. It certainly isn't the job security; even the largest studios have to lay off artists between projects. It's not the fame, or at least, not *all* about the fame. Yes, the top VFX artists do get screen credit. However, most artists get tiny print under the heading of the studio, and even the Oscars® in our category are presented in a separate, non-prime-time ceremony.

I believe that the driving force behind our behavior is simply the artistic satisfaction of seeing our creations on screen, and sharing those creations with others. The thrill of seeing your name in the credits isn't nearly as strong as the buzz you get from sitting in the audience and experiencing their reactions to your work. Even showing your work to your buddy in the next cubicle, or to a small group of your peers, is pure ego-joy. That's why most of us would continue our work, even if we never made another dime from it.

Doug Kelley

Issue #25 November/December 2001

## by David Warner

Less than two months have passed since I wrote my previous column and already NewTek has released an upgrade to LightWave 7.0. Most people, myself included, felt that the LightWave 7.0 upgrade was one of the most stable and impressive versions released in many years. The v7.0 code was rock solid and mostly bug-free with many cool new additions that were very useful. Most LightWave users were extremely happy with LightWave v7.0 and would have been content to wait half a year or more for a new update, but NewTek surprised us all with v7.0b.

So, is LightWave v7.0b any good? Yes! Did NewTek drop the ball and make a solid new upgrade buggy and unstable? Hell, no! The LightWave programmers are now proving that the effort to rewrite all of the v6.x program code is paying off in tremendously increased power and flexibility. More importantly, the new program architecture is allowing NewTek to release new and more stable updates on a much more aggressive timetable. These guys are doing an amazing job, adding and improving features while squashing bugs left and right. And if the rumors are true, LightWave 7.0b will probably be replaced with a new upgrade around the same time you read this. Kudos to the LightWave programmers for doing an outstanding job and making this a very exciting time for all LightWave users.

Now that I've taken a few paragraphs to sing the praises of LightWave and the NewTek programmers, I'd like to make a few comments about how LightWave is being marketed and why so many LightWave users are being 'forced' to switch to Alias|Wavefront's Maya3D.

In the past year, more jobs for Maya animators have become available and it seems that more FX houses are switching to Maya after having many years of success with LightWave. This is in spite of the fact that most Maya converts say they miss LightWave and would give anything to still be using it. So what is going on here? Is Maya better than LightWave, or are the people who make the business decisions somehow being convinced that Maya is better than LightWave?

From my personal experience and from the accounts of people who were LightWave veterans and are now 'stuck' using Maya, the consensus seems to be this: While Maya is more flexible and capable of doing more complicated effects than LightWave, it takes a lot of time and energy to set things up in Maya and to actually knock out final animations. LightWave has an intuitive workflow that makes it possible to model, set up, animate, and render the entire scene in less time than it would take to just model the same objects in Maya. In fact, most of the FX houses that are switching to Maya are still keeping copies of LightWave around, mainly to model and to render their final scenes.

The bottom line is that, in many people's opinion, Maya is a more powerful and flexible tool for actual animation, but overall LightWave is a much better package and you can get an entire project done much more quickly in LightWave. Ultimately, both of these programs are just tools. If you are comfortable with both of them (and can afford both) then you should use each tool where it's most appropriate.

Unfortunately, the belief that Maya is the most powerful 3D package on the market has become firmly entrenched in the minds of many producers and other people who make business decisions. Even most schools are now teaching only Maya, which further enforces the idea that Maya is the program that everyone should be using. This belief is strongly encouraged by a marketing campaign that has very deep pockets and a lot of weight to throw around. Take a look through any video magazine and you'll see Maya ads on multiple pages while LightWave may appear on one or two pages, if at all. This all comes down to a matter of resources. Alias|Wavefront has money to burn while NewTek has to carefully plan its advertising campaigns to make every penny count. Marketing is a very slippery slope and every company's success depends entirely upon their ability to market their products.

The computer industry is full of examples where mediocre software that is marketed very well has won out over excellent software with poor marketing. I strongly encourage NewTek to reevaluate their marketing strategies for LightWave and all of their products. NewTek is an industry leader in terms of well-written software, yet most people have no idea who they are. As more and more people discover the joys of digital video production, NewTek MUST make an impact on this growing market in order to be as successful as they should be.

Please take note, NewTek: you already have some of the best products available on the market, now it's time to REALLY let the world know about them!

Here's this issue's selection of questions and answers from the LightWave mailing list.

**Q** Is there any way to replace a single object in a scene with another object that has multiple layers? If I try to replace a single-layered object with another object that has multiple layers, the only thing that gets loaded is the first layer and all the other layers are left out. What is the work-around to this problem?

**A** Unfortunately this task is much more cumbersome that it should be. When LightWave started to load objects on a layer-by-layer basis, an option in the Replace Object function should have been added that would allow the user to load all layers from the new object. This much-needed option does not exist, but here is a workaround.

Replace your object with a null object. A null object is nothing more than a single point created in Modeler. If you don't already have a null object saved to disk, then go into Modeler, create a point at 0,0,0 on all axes, and then save it as nullobject.lwo (or something comparable). With this nullobject loaded into your scene, you now have a placeholder for your new multi-layered object. This placeholder will contain any keyframed movements or anything else that you applied to the original object. Next, load the multi-layered object that you need to bring into the scene. Parent this new object to the nullobject. You're all set; the new multi-layered object will 'stick' to the null object, and any future changes you make to the nullobject's motion path will be applied to your multi-layered object.

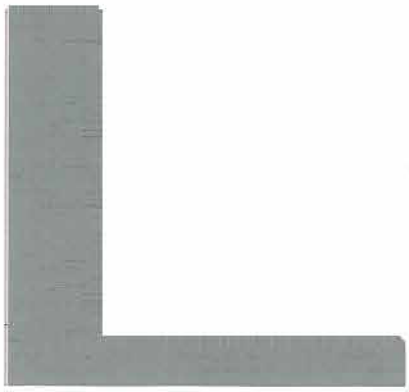
Keep in mind that if you had any bones or displacement plug-ins or anything applied to the original object, you will need to transfer that displacement data from the nullobject to the new multi-layered object. Displacement data can be copied and pasted to the new object pretty easily. Bone displacement movements can be applied to the new object by activating the Use Bones From Object function in the bones panel. As I mentioned at the beginning of this answer, this cumbersome workaround would not be necessary if the Replace Object function was modified to work correctly with the new multi-layer object format. I hope this issue will be addressed very soon.

**Q** I really like the power of the new SkyTracer2 pixel filter but I don't see a preview window like the one in the original SkyTracer plug-in. What's the secret to generating previews in SkyTracer2?

**A** SkyTracer2 and many of the other plug-in preview functions in LightWave 7 now rely entirely upon Viper to generate quick-rendering preview images. So before you launch SkyTracer2, click on the Viper button to open up the preview renderer. Whenever you are ready to preview your work, just click on the Render button in the Viper panel.

**Figure 1: The new SkyTracer2 plug-in interface.**

**Q** I just upgraded to LightWave 7.0 and I've been experimenting with the new SkyTracer2 pixel filter. It's very cool, but I think I have found a pretty serious bug that will actually crash Layout. After adding the pixel filter to a scene and playing around with it, when I go to remove the filter from my scene, Layout will crash. Any idea what's wrong here?



**A** It's not really a bug, but there is a problem with the SkyTracer2 plug-in code that should be corrected to prevent Layout from crashing. What has probably happened is that you still have remnants of LightWave 6.5 on your system, or you have been running LightWave 6.5 and 7.0 together and this has corrupted some of your configuration files.

One thing that I am not particularly happy about is that with the release of LightWave 6.0, the program configuration files (".cfg") started to be written into the Windows or MacOS system folders. In the past, these config files were always stored in the same folder as the programs, which made it very neat and easy to find everything. Keeping things this way would have also allowed different versions of LightWave to be run on the same machine without stepping on each other's toes, but that option is no longer available.

A number of significant changes were made to the config files that are generated by LightWave v7.0. So if you happen to go back to an older version for some reason, then there's a very good chance that you will corrupt the v7.0 config files and bad things will start to happen, such as your SkyTracer2 crashes. This means that once you upgrade to LightWave v7.0, you should never run any of the v6.x programs again. As I said, it's a shame that NewTek opted not to keep the program config files in the same folders as the programs, which would have avoided this problem altogether.

The solution to your problem is to go into your computer's system folder and look for the various LightWave config files. The files you should be most concerned with are LW3.cfg,

LWM3.cfg, and LW3ext.cfg. Delete these files and then re-run the v7.0 version of Layout and Modeler. You will need to re-add all of your plug-ins again to get everything working the way it originally did. Once this is complete, the SkyTracer2 plug-in should work fine. There are also a number of other annoying little crashes and bugs that have been attributed to this problem, so once you have cleaned up your LightWave v7.0 config files, make sure you never run v6.x ever again. It's a good thing the v7.0 and 7.0b program code is rock-solid and completely eliminates any need to run the older versions of LightWave.

**Q** I have an object that I'm working on in Modeler and I have somehow lost the ability to use the Select Connected function on this one object. The function works fine on other objects, but what would cause it to not work on one specific object?

**A** This can happen when you have polygons joined together and sharing points in a way that Modeler finds "confusing". Usually the solution to this problem is to use the Unweld function in the Detail|Points tab. This function will add points to the polygons you currently have selected so that those polygons do not share points with any connected polygons, thus allowing you to correctly use the Select Connected function. In order to ensure proper shading of your object's surface, you should consider using the Merge Points function to remove these extra points before rendering the object or applying any SubPatch operations. You should also press 'w' on the keyboard to bring up the Statistics window and look for any other possible problems in your object, like 1- or 2-point polygons that may cause other problems.

**Q** I have created a default LightWave scene that has all of my standard 3-point lighting and camera options set up already. Instead of having to start LightWave and then load my default scene, is there any way to have LightWave automatically load my default scene each time I launch the program?

**A** There has been discussion of a possible way to do this through The Hub, but I'm not clear on exactly how this is done. However, I do know that if you're running Windows, you can just edit the program shortcut so that it also contains the filename for your default scene. There are no special program flags or anything; just highlight the Layout shortcut, click the right mouse button, and click on Properties. In the dialog field labeled "Target:", containing the "lightwav.exe" program name, append a space and then the full path to your default scene file. You must make sure that you provide the full path and file name, so be sure to include the drive letter, colon, and backslashes. Once you're done, click on OK. The next time you double-click on that shortcut, LightWave will load up your default scene immediately after it has launched. I assume that this works the same way on a Mac, but I have no way of testing it.

**Q** I was finally able to figure out how to use ScreamerNet and rendered a scene on 3 different systems. Unfortunately, all of the frames generated by the 2 additional render nodes contain errors and are unusable. Why did this happen?

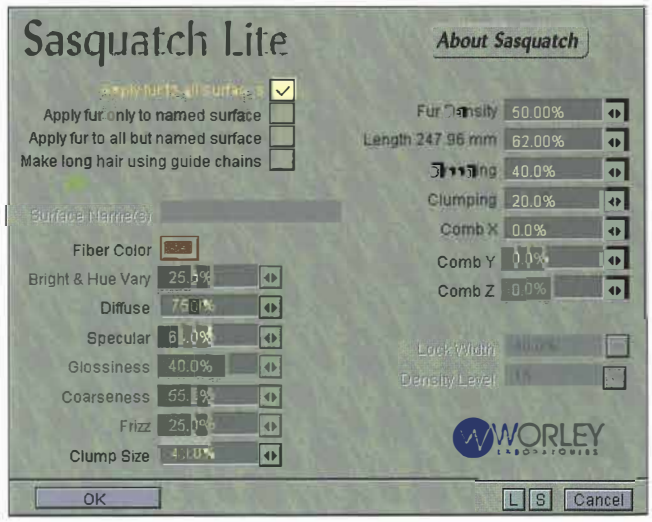
**A** This can be a tricky problem to diagnose, but here are some potential problems to look for. First of all, you need to make sure that all of the render nodes, including the host machine, are accessing a network mapped drive or directory. If you have your LightWave folder shared as drive name "L" then all of the render nodes should be configured to automatically reconnect to that same shared drive as "L". This will ensure that the scene and object files are all loading correctly when ScreamerNet starts to distribute work among the render nodes.

You also need to make sure that the LightWave config files are accessible on all of the render nodes. Since LightWave 6.x and 7.x now store their config files in the system folder and not in the same folder as the LightWave executables, this can be more difficult that it sounds. The easiest way to do this is to copy all of the config files to the system folder of each render node, and to do this every time you are about to use ScreamerNet. This is important: if you add new plug-ins to LightWave, they will be stored in the LW3ext.cfg config file on your main work machine, but this change in your plug-in config file will not be available to your render nodes until you copy that file over to each node system.

Pretty much every ScreamerNet render error can be attributed to a configuration problem in the networked drives, which results in an improperly loaded scene. It only takes one missing plug-in or image map to cause all sorts of problems in your rendered frames, so check everything very carefully and keep a close eye on the ScreamerNet message window on each render node to watch for error messages.

**Q** I have a large ground plane which I want to cover with grass. I tried to apply the new Sasquatch Lite plug-in with a maximum "Hair Density" of 250%, but the result is very poor, with blades of grass here and there. What am I doing wrong?

**Figure 2: The Sasquatch Lite plug-in interface.**



One way to improve the coverage of your object is to raise the Coarseness value in conjunction with the Hair Density value. The Coarseness setting can go up to 400%. If you apply this value with a Hair Density value of 250%, you will get very good coverage of your object.

If your ground object still needs more grass, try cutting the ground plane into separate pieces defined by surface name, then apply SasLite to each of the individual surfaces. The only downside to this technique is that your render times will probably go up a good bit because you will have multiple instances of the Sasquatch Lite plug-in running in your scene.

Also, keep in mind that SasLite is basically a demo version of the Sasquatch plug-in. You can create some very impressive effects with this plug-in, but it pales in comparison to the full commercial version. In this instance, you would be able to create a nice grassy plain with SasLite, but you would need the full version of Sasquatch in order to make the grass cast shadows on other objects in your scene or to make the grass wave in a simulated wind.

**On Topic Quick Tip**

If you haven't tried the RailBevel tool yet, give it a shot. You'll be amazed at what it can do! Simply create a spline curve that comes off of the polygon that you want to bevel, place that curve into a background layer, select the polygon you want to bevel, and then activate the RailBevel tool. You will be able to interactively bevel a shape that conforms to the spline curve in the background layer. The number of points in your spline curve will determine the number of segments in your curved bevel! Also, when using an interactive tool like Bevel, it helps to keep in mind that moving the mouse up and down will control the Shift amount of your bevel, while moving the mouse left and right will control the Inset amount of your bevel.

See you all again in the next issue.

*David Warner is the creator of the TutorVision 3-D series of multimedia tutorial CD-ROMs for LightWave. David has also created a set of searchable archive CDs for the LightWave mailing list that gives you quick and easy access to more than 100,000 questions & answers from other LightWave users around the world! For more info and a FREE Sampler CD, please visit* ***http://www.tv3d.com*** *or send some e-mail directly to Dave at* **dave@tv3d.com**.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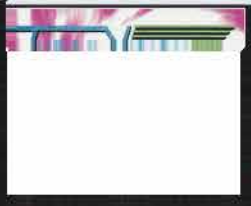

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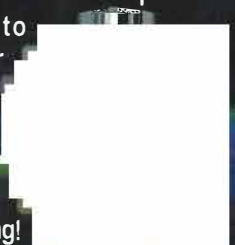

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# Macintosh: Up Close and Personal

## by Cailean Babcock

One of the pitfalls of buying a comprehensive animation package such as LightWave is the temptation to make it your one-stop shop for all of your 3D needs. While the challenge of creating a high-end animation completely within LightWave is a tempting goal, it's also an unrealistic one. No matter how much your hardware speed improves, so does the level of sophistication of your animations.

Let's look at an example: you've been looking at the drool material posted by NewTek and others on the web, illustrating the latest advances in radiosity and caustics available in LightWave. It seems so easy, you, too, can be creating photorealistic imagery in just five minutes! Several frustrating hours later, you're still trying to tweak the reflections on one simple object, and you've only got three renders to show for it. Why? Because recreating the amazing complexity of the world around us comes at a heavy price in computer resources. As scene complexity and sophistication increases, so does the render time. Often, so much time passes during the render process that you forget what it was you were tweaking. So does this mean that you should just give up? Not by a long shot. The tried-and-true tradition of "faking it" still has an honored place in the animation community. When it comes to getting the job done and looking right, results are all that matter.

I'll admit, this is easier said than done. The traditional process taken by the high-end professionals (i.e., the movie industry) involves rendering the image in multiple passes. Each pass contains specific information about the optical qualities of the composition: specularity, color, reflection, lighting, shadow, etc. When combined correctly, the passes create an image that is not only amazingly realistic, but also easily tweaked to bring out the best qualities that will sell the realism of the final shot.

We're not just talking about photorealistic animation. The majority of animators find their bread and butter in corporate logo spots and broadcast graphics. Grouping renders by location within a shot (foreground, middle ground, and background) can be a great time-saver for turning out a quality product on schedule. A fractal background created with Hypervoxels might look great, yet require a great deal of time to render. Say you're tweaking a simple metal surface on a logo object placed in that scene. Who wants to wait for the entire background to render just to see the effects of copper versus brushed steel? Rendering out the scene in isolated layers, then bringing it back together again later, can be so much faster.

This recombining takes place in a separate, 2D process known as **compositing**. This can be done in many different ways. There are fairly straightforward, albeit limited methods, within LightWave. There is also the possibility of a separate dedicated compositing program that can offer more sophisticated results. And what is the most important factor to justify spending the money for a separate compositing package? Time. As any animator knows, the crucial factor in any animation is the time it takes to render out the final product. While an artist might hope to create a complete animation with every possible effect in place at one go, this is not always feasible due to time constraints. However, this problem can at least be resolved by means of compositing.

For some basic compositing effects, LightWave does offer some options through the Scene|Effects|Compositing tab. Here you can find some very useful tools for simple compositing of digital elements within a real-world environment. However, there are two major problems with the approach. The first drawback is that, should changes need to be made to the scene's settings, the entire project must be re-rendered, which can be a very time-consuming undertaking. Secondly, you can only composite at most three layers of footage at a time, and at least one of these has to be rendered before it can be viewed.

Because of the nature of compositing, it requires only a fraction of the time to create an effect and tweak it to your satisfaction. There are a multitude of compositing packages available, and many of these are available on the Macintosh platform. The top three of these are Puffin Design's Commotion, Adobe System's After Effects, and Discreet's Paint. eyeon software, maker of the Digital Fusion compositing package, has announced that they will soon be releasing a port of their software on OSX. NewTek itself offers an excellent and affordable program named Aura as their all-in-one paint and compositing solution. However, it is as yet sadly unavailable for the Mac.

More sophisticated results can be found in external programs such as those mentioned above. Commotion, for

example, excels in the realm of green-screening, blue-screening and rotoscoping. After Effects is a more all-purpose package which, up until recently, was strongly biased towards logo effects. Finally, Discreet's Paint focuses primarily on motion tracking and automatic rig removal.

Let's look at a couple of examples from the Production Bundle version of After Effects 5.0. There are several features included in this software package that makes it incredibly useful for animation. First of all, the number of footage layers that can be created in one composition is virtually unlimited (**Figure 1**).

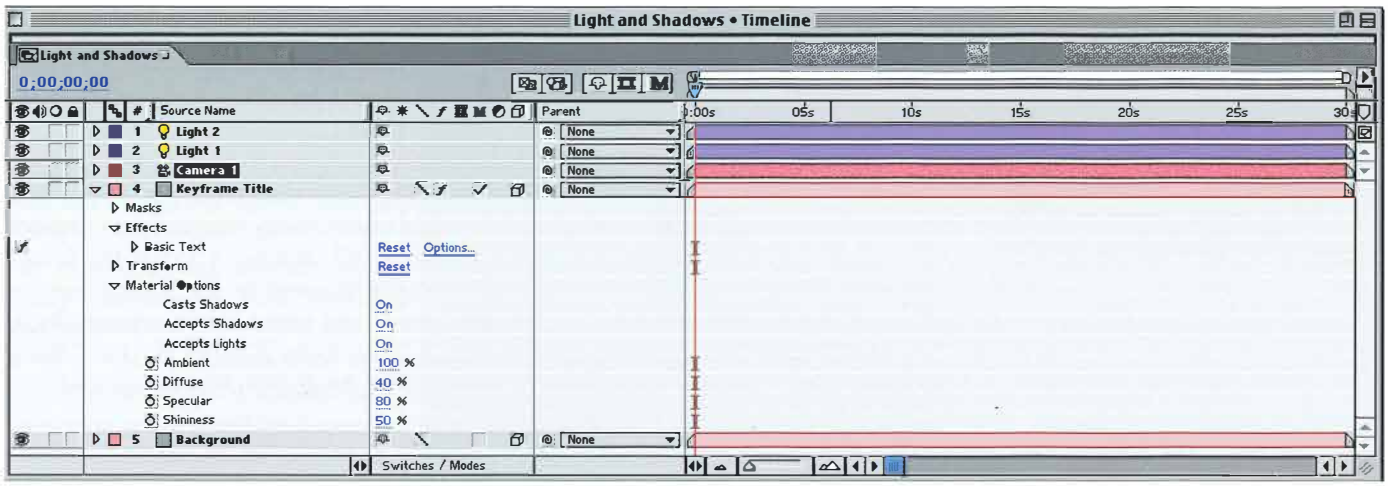
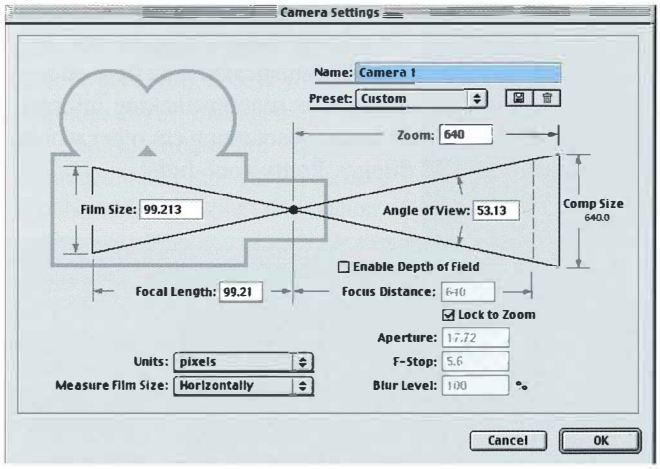



**Figure 1: A quick glimpse of After Effect's timeline window. Here you can control not only basic layer settings, but animation controls, layer masks, and plug-in effects. Elements can be parented to each other a la LightWave, as well as controlled through an elegant expression engine.**

**Figure 2:After Effects 5.0 enables you to create cameras for rendering of 3D effects. You can select from common presets or create your own.**




The process of compositing has been unofficially dubbed "2.5D" due to the fact that, although it is a flat image, it is often multiple layers deep. This is similar in concept to the traditional method of cel animation, where multiple layers of celluloid are placed on top of each other to form the complete image. With applications such as After Effects 5.0, this line blurs even further. After Effects supports a truly three-dimensional "stage" in which layers can be designated 3D by the simple toggle of an option. This means lighting and shadows are computed directly in After Effects. This also means support of true depth-of-field and camera optics, because the effects are no longer being applied as a fancy blur to a 2D image but are actually being calculated using a simulated camera lens (**Figure 2**). With the introduction of a z-axis in a compositing program, animators now have a new degree of freedom to create expensive 3D effects in a fraction of the time. Can we say, "volumetrics"?

## BIT O' TRIVIA:

**The pilot episode of *Enterprise*, the latest installment in the Star Trek universe, incorporated just such an effect. The Enterprise ship moving through the clouds of the gas planet was actually created using After Effects' 3D stage.**

Let's look at an example using a content scene from way-back-when, Blade.lws (located in the Content/Scenes/Space directory). This scene uses lens flares and fog effects rendered in-engine. The setup time for this project would typically be prohibitively time-intensive. How can you make something like this work and still deliver to the client on-time and on-budget? If only

our compositing software could have access to the same depth information that LightWave does. As you might know, this very thing is possible thanks to LightWave's ability to save out amazingly useful pieces of render-time information, such as z-depth, object ID, shadow buffer, material buffer, and every aspect of shading that you can imagine: specularity, diffusion, reflection, etc.

When transferring such information from one program to another, it is common to use the RLA image format, which can save such information natively. This does have its drawbacks: many programs have only limited import and export capabilities for this kind of file. I find myself usually using the z-depth information the most, as it can be indispensable for the creation of depth-of-field and fog effects in post. This can be saved out in RLA format or exported as a grayscale image that can be read in by your compositing package. The depth image isn't always as good as using the RLA format: The depth image is not antialiased and is limited to 8-bit (256 level) information, whereas the RLA format is floating-point and antialiased.

**Figure 3: LightWave's Extended RLA Exporter plug-in enables you to save important scene information, such as the z-buffer, directly within your image files.**

In addition to the usual RGB and alpha channels, I also need the depth information for later compositing. In order to store all this information in my image, I didn't render the sequence through the Render Options panel at all. Instead, I saved the image sequence using the Extended RLA Export plug-in (located in the Effects panel's Processing tab, under the Add Image Filter menu), and saved it to a separate RLA sequence (**Figure 3**). This option gives me direct access to the Z-buffer in After Effects (After Effects 5.0's 3D tools are only available in the Production Bundle version).

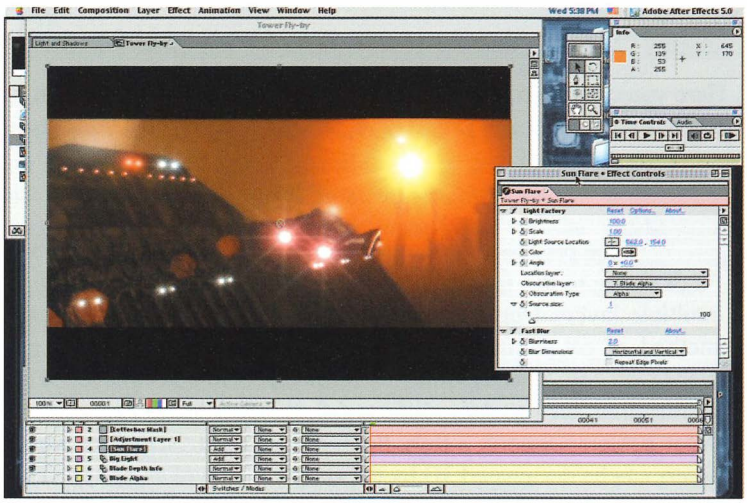


**Figure 4: Sophisticated effects in the blink of an eye can be created directly within your compositing window. Adjusting such effects can be performed almost in real-time, saving hours of aggravating trial-and-error.**

Once in After Effects, I can now use the information from the extra image sequence to add the fog back into the rendered footage. With the speed of the compositor's render engine, I can tweak my fog settings interactively until I'm satisfied with the effect, rather than the trial-and-error of multiple costly renders. I can also add depth-of-field blurring, an effect that was missing from the original 3D shot. Finally, I can replace any or all of my lens flares with lens flares created in After Effects. In this case, I created a sun effect using Puffin Designs' Knoll Light Factory (**Figure 4**). This sophisticated plug-in not only allows you to custom-build sophisticated lens flare effects, but it also obeys things such as motion-tracking information and alpha-channel-based obscuration (in other words, it disappears behind things). Pretty cool, huh?

Just as in LightWave, most compositing programs include support for many third-party plug-ins as well as a mind-blowing number of built-in effects that can keep you busy for hours. The Yoruba Potters example shown in **Figure 5** is an application of such effects. The actual 3D imagery was rendered in separate layers consisting of the main title, the secondary title, the ampersand, and a final pass of the African continent. Bringing these together in a compositor gave me an added level of control in my final movie. Z-depth based drop shadows, dark haloes around text for better clarity, and the addition of background elements and film footage were accomplished directly within After Effects. Highlight blowouts and color-correction finished up the mix, saving serious time and effort. This allowed me to create a professional final product in a very short time.

**Figure 5: 3D or not 3D? In this example, the 3D elements become building blocks for 2D image effects, resulting in a more complex shot that would be difficult if not impossible in a 3D package alone.**

Compositing packages also offer their own benefits at render time. For example, you can queue multiple compositions to render, with or without a network (and trust me, the render queue in After Effects is a lot easier to deal with than LightWave's own ScreamerNet). Your output options are similar to those available in LightWave, with the additional benefits of being able to embed audio in the movie file or even output multiple versions of the movie. For example, you can create one movie that is ready to be delivered to the client for broadcast and another web-ready version for your on-line gallery.

Whether it be a simple logo animation or a sophisticated special effects shot combining 3D and live action plates, compositing software can offer you speedy results without the unnecessary use of your 3D software. For the self-sufficient animator, this means faster turnaround times and more sophisticated effects within a smaller budget, enabling you to raise the bar on your animations and graphic effects. Programs such as After Effects give you access to Photoshop-like layer management with an easy-to-understand timeline. Combined with LightWave, you have an unbeatable animation combination.

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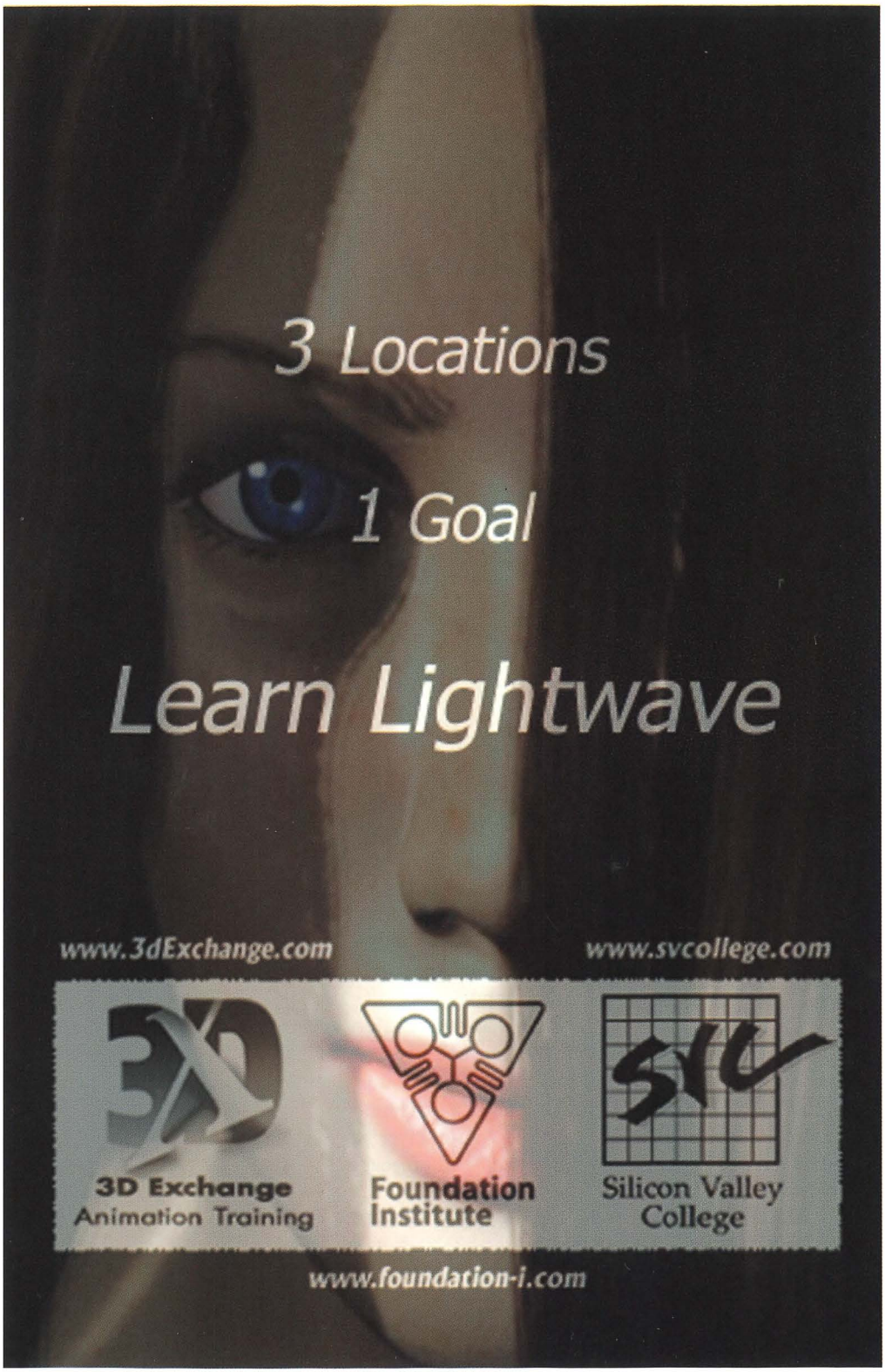
*Mac images courtesy of Apple.*



# Tools That Work II

## by Kyle A. Thatch

In the March/April issue of Keyframe, I covered three features of the new 6.5 Modeler interface. In keeping with that theme, here are three more tools that should be added to your Modeler repertoire: Aligner, Spline Guide Tool and Rail Bevel. This article is intended for beginners or those who are updating to LightWave 6.5 or 7.0.

### Aligner

If you have not introduced yourself to this tool, you should. If you are familiar with One and Only Media's MacroForm, then you will understand this tool right away. This tool operates almost exactly like the Align & Center tool from MacroForm's Productivity Toolset. Actually, all of the tools I am going to cover are similar to MacroForm's Toolsets (Hmmmm). OK, enough of that, let's talk about how this tool is the one you can't live without. Take a look at **Figure 1**. At first the interface may look a bit intimidating, but if you break it down you will see it is quite simple.

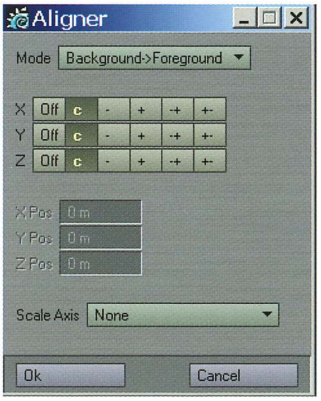



**Figure 1: Aligner tool panel**

Let's start with the Mode window of the interface. There are four settings: World, Foreground to Background, Background to Foreground, and Absolute. If you are using World Mode, then object(s) in the foreground will be affected. Using FG to BG Mode, objects in the foreground layer will be aligned with objects in the background layer. BG to FG is the opposite of FG to BG Finally, Absolute Mode is used like World Mode except that you define your own center point. I am basically repeating the manual here (page 23.17 of the LightWave 7 manual). Using **Figure 1**'s parameters as an example, the object(s) in the foreground layer would be centered on all three axes of the background object(s).

"What's the big deal?" you say. OK, I hear ya. Hold on to the chair, or whatever is available. Say you have a Cube in layer one, and a sphere in layer two. Now, you want the sphere to rest on the top of the cube. You could just use the move tool, right? Sure, go ahead and make your move. What if you need it to be precisely aligned or resting on top of the cube? Using those weird looking buttons, select the (-+) button. (I hope you were holding on.) I think if you take the time to play around with the Mode and X, Y, and Z controls, you will see that this is a must-have and must-use tool.

The next set of X, Y, and Z buttons enable you to set the center point when in Absolute Mode. Simply put, this means you will assign a center point from true center (0, 0, 0) where the alignment will occur. I really do not see us using this feature often, but you never know.

The last window to cover is the Scale Axis window. This can only be used in the FG to BG or BG to FG Modes. Besides being able to align your objects to one another, you can also scale them to match all or partial axes. But wait, there's still more. What if you want to align to a specific area or polygon of an object? Not a problem! Here's how: Select the portion of your object that you wish to use as the alignment point, (for example, the hinge point/edge of a door opening). Choose the appropriate Mode, FG to BG or BG to FG. Next, use your XYZ alignment modifiers and Scaling options to complete the alignment process. By the way, you will not find that tip in the manual.

Another tool I will only mention (despite its being very useful) is the Rotate-About-Normal Tool. Check it out; I think you will find it very helpful. I have noticed that several of the Modifying Tools duplicate themselves in the form of repetitious functions. Aligner could replace most of the Centering Tools, in my opinion.

### Spline Guide Tool

This tool enables you to create a spline, then perform one of many deformation operations to your object based on how you move the points of the spline. Take a look at **Figure 2**. You can set from 5 to 200 curve points depending on how much control is needed in your spline. The axis portion of the interface is used to select the placement of the curve relative to the object. Operations include: Scale, Stretch, Twist, Bend, and Weight Map. Finally, for our example, Center is where the spline will be centered relative to the origin, (0, 0, 0).

**Figure 2: Spline Guide tool panel**

I will not go into great detail about all portions of the interface, but instead I will illustrate a way of using the tool to create an approximate light bulb shape from a sphere. As shown in **Figure 3**, I started by creating a globe with 36 sides and 16 segments. I then selected Spline Guide from the Modify Menu and left the default settings as is. I adjusted the points of the spline to get the shape shown in **Figure 3**. Closing the Spline Guide tool, I next used Stretch to elongate the shape to what you see in **Figure 4**. This tool becomes extremely powerful when you consider that it enables you to use many different deformation tools. Experiment with this tool, you'll be glad you did.

**Rail Bevel**

This has got to be one of the most-needed tools to come to LightWave for quite some time. Have you ever beveled and beveled and beveled an object to get a particular shape? What if you could put a profile curve in the background layer and bevel or extrude to that curve? That is exactly what Rail Bevel does. As the manual says, Rail Bevel works the same as Bevel in regards to its controls. You can numerically input Shift and Inset settings, or use your mouse to watch your Shift and Inset effects as you apply them.

For this example I used the pen tool to create a shape that resembles a bottle. I then killed the polygon and selected the points again and made an open curve. Placing the curve in layer 2, I proceeded to make a square shape with rounded corners in layer 1. With layer 1 as my foreground layer and layer 2 as my background layer, I selected Rail Bevel from the Multiply Tab. Choosing to use my mouse instead of numerically inputting my shift and inset parameters, I matched the shape of the curve as best I could, as shown in **Figure 5**.

**continued on page 17**

**Figure 5: Rail Bevel tool in action.**

# Creating Shockwave 3D Content with LightWave

by Dave Wolfe

Shockwave3D is a real-time 3D format for the web and has a wide range of uses, from simply displaying a 3D model to creating a full-blown virtual 3D world.

Before we start exporting to the Shockwave 3D format from LightWave, open the tutorial model Jack.lwo in Modeler, as shown in **Figure 1**. The model consists of 982 triangles. There is no set limit for the number of polygons your Shockwave model should have; however, you will generally want to keep the count fairly low, because too many polygons will cause the viewer's computer to slow to a crawl. You should also triple the polygons when using bones, to avoid non-planar polygons when animating.

**Figure 1: Jack1wo in Modeler.**

Jack has three surfaces. 'Bone' is used by the Skelegons and can be ignored. 'Pumpkin' is used by the entire character except for the bits of straw coming out of the neck and arms. Pumpkin has one texture map (**Figure 2**) in the color channel using UV projection. Note that Shockwave only supports the first texture layer. Using one or two UV maps is a good way to help keep the file size down, because lots of surfaces and image maps will increase the download time and slow performance. The Shockwave3D Export plug-in supports all types of texture projection used in LightWave; the textures are converted to UV maps when exported.

**Figure 2: Jack.bmp texture map used for Pumpkin surface.**

The third surface is 'Straw,' and it also has one UV map (**Figure 3**) in the color channel. The image map used for Straw has an alpha channel saved with the image file to knock out the white border around the straw. You don't need to use a transparency map for this, it's automatic. Also notice that the polygons using the Straw surface appear double-sided. Shockwave doesn't support the "Make Double Sided" option in the LightWave Surfaces panel, so to make the polygons double-sided you need to select them and use the Make Double Sided plug-in. You can find this plug-in in Modeler by clicking the Detail tab, then clicking the More menu under the Polygons group.

**Figure 3: Straw.tga texture map.**

Jack has 16 Skelegons and 16 corresponding weight maps. Having a small number of bones will help keep the viewer's computer from slowing down too much and also reduces the file

sizes. If you open Skelegon Tree (Detail tab, Other group) you'll see that the Skelegons are all prefixed with the object name, 'Jack.' This is because Shockwave doesn't like multiple bones with the same name. If you were to try to export multiple boned characters and they had the same bone names, only one set of bones would be animated. The weight maps are also prefixed with 'Jack' for the same reason. Each weight map is named exactly the same as the bone influencing it, so when the Skelegons are converted to bones in Layout the weight map assignment is done automatically. Bone influences in Shockwave aren't quite as advanced as in LightWave: each bone must have its own weight map, all points must be assigned to a weight map, and points can only be assigned to one weight map.

Start Layout, open JackWalk.lws and press the play button. You should be able to see that this is a quick-paced walk cycle using IK. Before we export the scene to Shockwave we have to do a few things. First, open the Item Properties panel for Jack's bones, **Figure 4**. You'll notice that each bone has a weight map assigned, Use Weight Map Only is checked, and Weight Normalization is unchecked. These options will make sure the final Shockwave animation will look as much like our animation in Layout as possible. Shockwave doesn't support IK animations, so we'll need to bake the IK into the leg bones. You may notice that the feet rotations were not done by using Match Goal Orientation. This is because neither Shockwave nor Motion Baker supports that feature, so the foot rotations would not export properly.

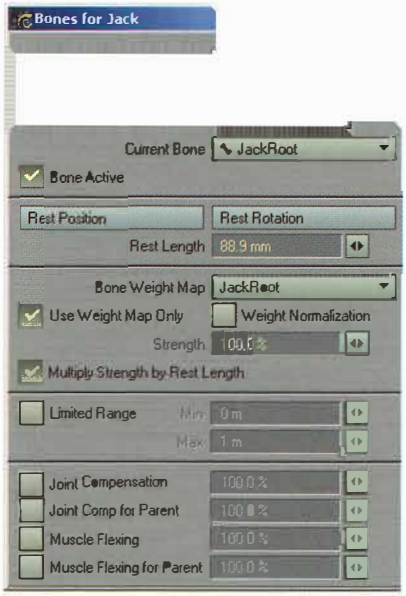
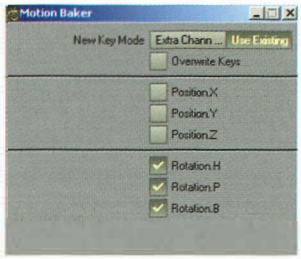



**Figure 4: Item properties panel for Jack's bones**

**Figure 5: Adding Motion Baker to the Modifier list.**

Select the left thigh bone and open the Motion Options panel. Click the Add Modifier list and choose Motion Baker, **Figure 5**. Motion Baker should now appear in the modifier list; double-click it to open its properties panel. The New Key Mode should be set to Use Existing; this will create the baked keyframes on the existing XYZ HPB motion channels. Check the rotation channels, HPB,

**Figure 6: Motion Baker properties panel settings.**




but leave the position channels, XYZ, unchecked as shown in **Figure 6**.

Close the Motion Baker window. In the Options panel, turn off Play at Exact Rate, then close the Options panel. Click the Play button in Layout. Let the animation play through and create keys for each frame, then pause the animation. This completes the baking process for the left thigh bone.

Repeat this process for the right thigh and the left and right calves and feet. Although you can bake many bones at the same time, it will slow the computer to a crawl if you try to bake too many at once. It's usually faster to bake two or three bones at a time. Now that the IK has been baked, we can also clear the two IK nulls from the scene.

The last thing we need to do before we export the scene is to set the start frame to 0 and the end frame to 16. Frame 0 is not used as part of the animation, but Shockwave uses it to determine the rest position of bones, so frame 0 must be exported.

Now we're ready to export our scene. Make sure you have added both lwmonitor.p and S3DExport.p plug-ins. Click the Display tab, then click Plug-in Options. Click the Generics menu and click Shockwave 3D Export, as shown in **Figure 7**.

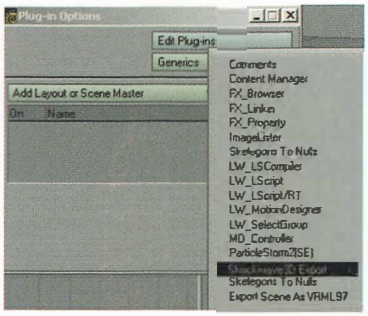
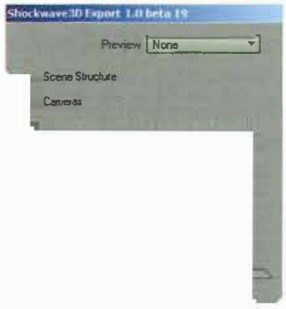



**Figure 7: Adding the ShockWave3D Export plug-in.**

**Figure 8: ShockWave3D Export panel**

The export options, **Figure 8**, are self-explanatory for the most part, but there are some that can be confusing. The preview option will give you a quick preview of how the scene you exported will look in Shockwave. It's very similar to the Shockwave preview in Director, but you don't have as many options as you have in Director.



Under the preview options you'll see Scene Structure, Cameras, Lights, Surfaces, Objects, Animations, and Texture maps listed with checkboxes next to them. The latter three also have a Quality setting on the left. You can uncheck any items you don't want to export. The Quality settings are pretty self-explanatory, but the Texture maps Quality setting can be very useful for keeping file sizes down. If the object you are exporting won't be examined too closely or carefully by the viewer, you can turn down the quality setting and have faster download times.

Next there are four tabs which contain extra export options: Objects, Animation, Textures, and Cameras. In the Objects tab, the first option is 'Enable Toons and SDS.' Toon is for using cartoon shading in Shockwave, and SDS is for Subdivision Surfaces, better to known to LightWave users as MetaNURBS or SubPatches. If you don't plan to use either of these features, it's best to disable them to keep the file size down. The next parameters are Crease Angle and Normal Deviation. Crease Angle is the vertex normal compression, and Normal Deviation is the tension for LODs. These parameters only apply if you're using object compression. For Jack, we'll just turn off Enable Toons and SDS.

The Animation tab contains a Bones option for exporting bone animations and Force Sampling. Force Sampling is generally a good idea to keep your animations looking the same in Shockwave and LightWave. Shockwave uses a different rotation method than LightWave, so not sampling your animations can sometimes have undesirable effects in Shockwave. The interval controls how many frames are sampled: each frame (1), every other frame (2), and so on. A larger interval results in a smaller file size but, depending on how many frames your animation is, it might not be very significant reduction. Start and End are the frames the sampling should start and end on, and these should usually be set to the same as the Start and End frame in Layout.

The Textures tab has two options, Override Size and Disable Alpha. Override size will set a limit on the resolution of the image maps used. This can have a significant impact on the size of the file, but it's usually better to do this manually. When you resize an image map sometimes you'll see seams along the edges of the UV mapping. If you do this in an image editing program, you can extend the edges of each section on the image map to hide the seams. Disable Alpha will ignore alpha channels in your image maps. This is fine if you don't want to have any transparencies in your objects, but for Jack we'll keep alphas enabled for the bits of straw protruding from his shirt.

The Cameras tab has options for the Camera, Fog, and Backdrop settings. You can choose to export No Camera, the Selected Camera, or All Cameras. For Fog and Backdrop you can also choose to export none, selected camera, or combine all. What you choose here will vary from project to project, but for Jack we'll just leave the default settings of Selected Camera.

The Shockwave3D Export plug-in has a few bugs and limitations you need to look out for. The following issues only apply to exporter version 1.0 Beta 19. Reflection maps don't show up unless you apply the reflection map as a texture map in the Specularity channel. Multiple characters with bones don't export correctly. You can work around this by exporting them as separate w3D files, then in Director you can use Lingo to copy cast members from one world to another. Multiple objects with UV maps also don't export properly. Again, use Lingo to copy cast members from one world to another. Scaling an object in Layout distorts it in Shockwave, as does altering pivot points in Layout. Cameras and lights can't be animated, so you must parent them to a null and animate the null. Director doesn't support morphing.

Click OK when you're ready to export. After you've named your file and clicked Save, a progress bar should appear as the plug-in writes the file. To view the file, start Director and import the w3D file into the Cast. Double-click the cast member and the Shockwave3D window will open with a preview of Jack facing the side. Press play and the object will turn to face us and start walking. You can zoom, pan, and dolly the camera from here to inspect the object and to make sure it exported correctly.

By using built-in Behaviors in Director, we can make a simple Shockwave movie that will play the animations and allow the viewer to rotate the model. First, look at the Property Inspector for Jack (**Figure 9**), then click the 3D Model tab. Make sure Direct to Stage, Play Animation, and Loop are all checked. Drag the Jack cast member onto the stage and set the size and position you want.

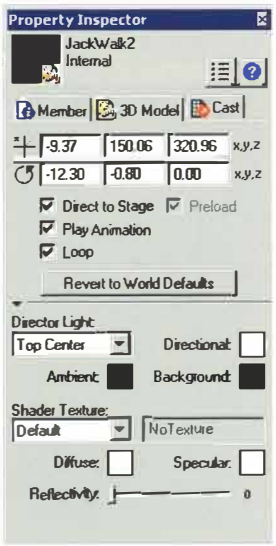



**Figure 9: Property Inspector for Jack.**

Open the Library Palette (**Figure 10**) from the Windows menu, then select Actions from the 3D sub-menu. Find the Drag Model to Rotate behavior and drag it onto Jack in the Stage. From the pop-up Options window, set the model to Jack and name the group Jack. Next, select Triggers from the 3D sub-menu and drag it onto Jack in the Stage. You can use the default settings for this option.

When you play the Director animation, you will see Jack animate and you can click and rotate him in the window. Now all you need to do is publish the final movie. Before you can publish, you need to save the movie. Save the movie as Jack.dir, then publish your movie by choosing Publish from the File menu. Director will automatically create an HTML file that loads your Shockwave movie.

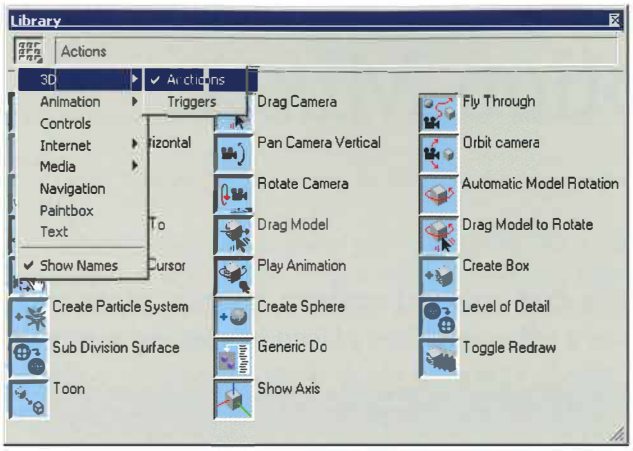



Figure 10: Library palette.

You can download the supporting files for this tutorial from the Keyframe website, including: the LightWave scenes, images and model; the exported model in Shockwave 3D format (JackWalk.w3D); the Director file with the appropriate Behaviors applied (Jack.dir); and the HTML file that loads the final Shockwave movie (3D_progbar.dcr, Jack.dcr, Jack.htm).

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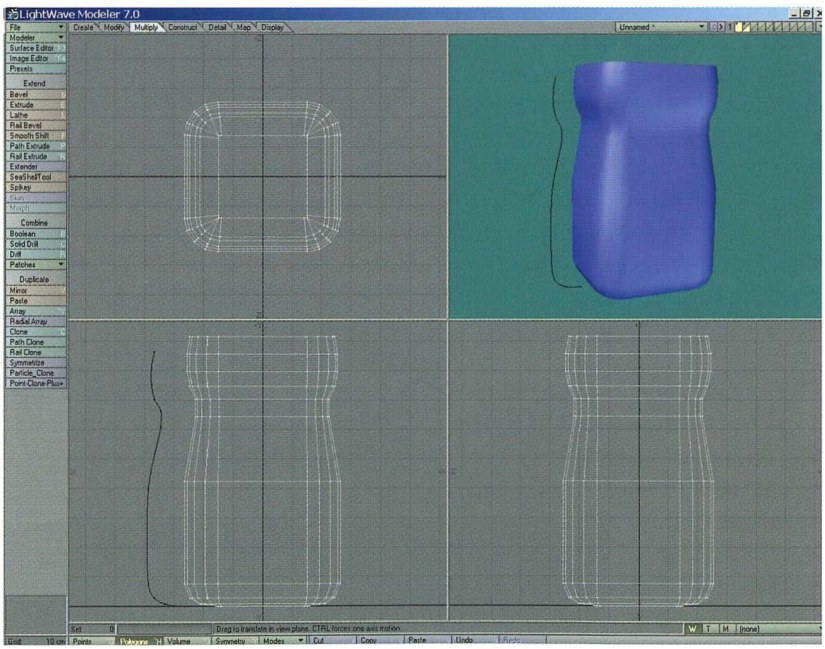
## Tools That Work II (continued from page 13)

Figure 6: Finished Rail Bevel operation.




Modeler seems to make the object open ended as well as making it upside down. I tried flipping the curve's start point as well as the normal of the base polygon, but still I received the same results. So, enter **Figure 6**. Think of Rail Bevel sort of like Rail Extrude with several rails to control the extrude. The difference is that Rail Bevel gives you much better results than multiple rails during a Rail Extrude.

### Wrapping Up

I hope that these tools will make your modeling projects a lot more productive. I know that the use of Aligner is a must when doing models for industrial projects such as machines, but it's also useful for modeling characters. There are other ways of doing deformations to an object than using the Spline Guide Tool, but I think none easier in regards to speed and ease of use. Finally, Rail Bevel is just a better way of creating compound beveling operations. Experiment with all of these tools and I am sure you will agree that life is much simpler now that these tools have been added to Modeler.

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# Animating With Motion Mixer

## by Michael Reiser

Just recently I was asked to produce a technical animation that involved multiple complex motions. It was to demonstrate some of the physical properties of a proton's behavior when placed in a strong magnetic field and then disturbed by a radio frequency pulse. In other words, it was to show what happens to water in an MRI unit. As if that was not enough, the presenter needed to be able to adjust the timing of these motions on the fly so that the two hundred physicians and physicists watching can see all of this happing in realtime! Oh, and by the way, the deadline is Monday!

My initial reply to this request was that it can't be done (not smoothly, anyway). Once again, LightWave and NewTek to my rescue. With the introduction of Motion Mixer to LW 7 the adjustment of animation 'clips,' including blending and changes in timing, is incredibly fast and intuitive. Let me show you how this master plug-in has changed the way I animate. Hold on to your mice and keep all hands inside the confines of your work station.

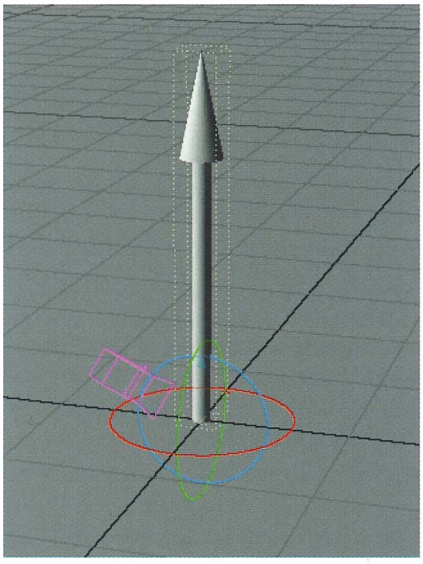


Figure 1: Vector mesh object

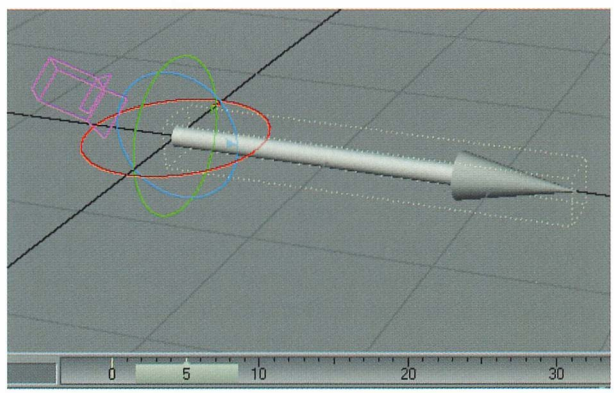
The modeling portion of this project was purposely made simple. We needed a smooth realtime OpenGL animation with no skips. This would all be running on a laptop that only has 8 megs of video memory, so we kept it simple.

The model is a single vector (arrow) that represents the main collective magnetic vector of hydrogen atoms as they sit in a magnetic field. No need to understand the physics here. What I needed to do was to make this arrow go through a number of complex behaviors that could be adjusted on the fly by the presenter. Did I mention that the presenter has never even seen LightWave before? Welcome to my hell.

Let me give you a brief overview of what I was trying to accomplish. Using the built-in Layout coordinate system as convention, the vector (initially pointing in the +Y direction) has to flip into the 90 degree XZ plane. Easy enough, but it will also have to flip 180 degrees into the -Y plane "interchangeably". By "interchangeably" I mean by the click of a button. The speaker wants to click one or maybe two things to have this behavior change. From the vector's respective positions (either the 90 or 180 degree flip) after having been flipped, it will have to return to its initial +Y position. Keep in mind this little vector is like a spinning top, so it's rotating the entire time.

The animation of this setup is really no big deal. We could all do it. Heck, LightWave would practically do it for you. The problem is the need for interactive control. Motion Mixer does this beautifully. I realize that not everyone needs to have an interactive OpenGL presentation, and I admit this project is unique. However, these tools can be used in so many different ways I thought that this would be an appropriate way to present them. The actual OpenGL presentation includes many other aspects (transitions, motions etc.) but to fit this into the confines of this tutorial I will only cover how to blend two motions and how to change motions on the fly.

Figure 2: 90 degree flip




The mesh object itself is so simple, as is the final setup, that there is no need to supply you with the object or the final scene. Load the Vector object (or any other object you wish to use in this exercise) into layout.

The first step is to give the object some motion. Keyframe the object as it is pointing along the +Y axis at frame 0. Now rotate the vector so that it is pointing at 90 degrees along the -X axis.

Keyframe the object at frame 5 as shown. (Or as you will see in a bit, however long you wish). Don't be concerned about which channels to keyframe. For now, key all channels. We will adjust this later as needed. You have given the vector a small flip motion into the 90 degree direction.

Figure 3: Motion Mixer

Open Motion Mixer. From the main tool bar open the Motion Mixer master plug-in.

When Motion Mixer opens you will need to tell it what objects in the scene it will be responsible for. In this case it is very simple because there is only one object. You can however have as many objects as you wish. These are cleverly called the 'actors.' To add our vector actor, first select the Create Actor option from the Motion Mixer tool set.

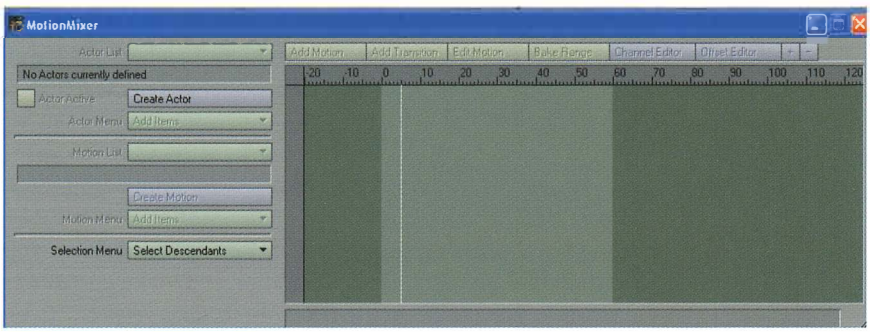



Figure 4: Motion Mixer

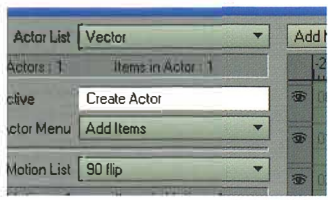



Figure 5: Create Actor

A panel will appear, allowing you to create a name for the actor.

Figure 6: Actor name

In this case I simply named the actor "Vector." An important thing to point out here is the Set Pose Frame option. For most animations this will be at frame zero, but in some cases you may wish to have this at some time other than zero. If you are having trouble blending a portion of animation taken from later in a scene, you may wish to try adjusting this option to see if it clears up the problem. For this animation we will leave it as is. Click OK to accept the actor name.

The next step is to make Motion Mixer grab the animation from Layout and bring it into the Motion Mixer world. Select the Create Motion option from the Motion Mixer tool set.

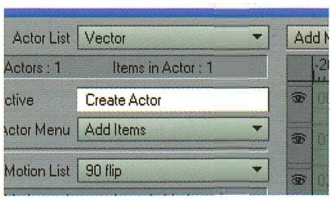


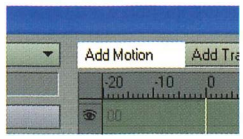

Figure 7: Create Motion

When you select this option a small menu will appear.

Figure 8: Create Motion Panel

Here I named the 90 degree flip, "90 flip". (Creative, I know.) If you had a number of defined actors in the motion, you would use the Actor Items option. In this case there is only one actor, so I chose to use the Selected Items option. I could have used either one. We will not be going into the Select XChannels button here. I simply did not have to use it. For a full description of its function, see the insert manual that came with LW 7. The Start and End Frame spinners are very important. They define the key ranges you will be bringing into Motion Mixer. Here all we need to grab from Layout is the animation we created earlier from frame 0 to frame 5. Click OK to accept these parameters.

Figure 9: Add Motion




Next you need to add this motion to the Motion Mixer workspace. To do this, click the Add Motion button on the top tool bar.

When you select this option you can add the motion you just created by clicking on the work area. You can add it to any line you like. I added the motion to the 00 time line. The + button on the top menu will add tracks if you need them.

**Figure 10: 90 Flip added to time line**

Scrub the Layout slider to observe the animation you just added to Motion Mixer. Click on the yellow block to move the motion in time. To change the length of the block, click and drag the block's ends. You can have the animation playing in Layout to see these adjustments happening in realtime.

Having one motion to play with is not all that helpful. We need to create another portion of animation to add to the excitement. To start with disable the Actor Active option in Motion Mixer, **Figure 11**. This will effectively separate Layout from Motion Mixer. Shrink Motion Mixer.

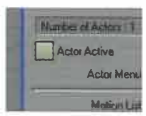


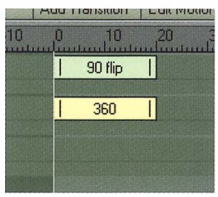

**Figure 11: Disable Actor Active**

In Layout, try scrubbing the frame slider. Nothing happens, not even the animation you just made; that motion has been moved over to Motion Mixer. Now we have a clean slate. Keyframe the vector object again at frame zero. It should be pointing straight up along the +Y axis as it was when we started. Now keyframe the rotation of the vector object through 360 degrees around the Y axis. It should look like a spinning top. It does not really matter over how many frames you make this action. As you just saw in Motion Mixer, you can adjust its timing at will.

To bring this new animation into Motion Mixer, go through the same process as you did for the initial 90 degree flip. This time, however, you don't have to create a new actor; it's the same one. All you need to do is to create the motion, name it, define its time span (by dragging the ends) and place it into a separate time slot in the work space.

I named the new motion 360. I dragged and timed the motions to each be 20 frames long. Activate the Actor Active button again and scrub the animation. Not really what you expected? The first time I did it I did not get what I expected either. Let's see what we need to do to change it. Open the Channel Editor option on the top tool bar in Motion Mixer.

**Figure 12: 360 Added to Motion Mixer**




You will notice that each motion we had created earlier is listed in the left column, and the actor (Vector) is in the center column. The thing that we want to look at here is the Item Channels in the right column. Notice here that I only have the

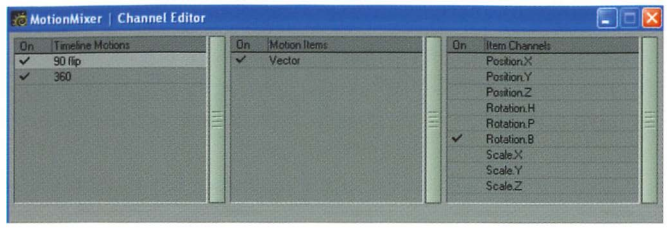


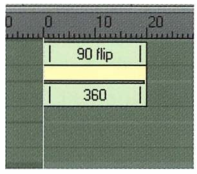

**Figure 13: Channel Editor**

Bank Rotation checked. That is because all we really needed to key was the banking motion in the 90 degree flip, nothing else. We could have made that distinction when keyframing, but I like to have the control here if I want it. Not shown is the Channel Editor settings for the 360 motion, where the Heading is the only thing checked. With these changes made, now scrub the animation.

This seems as good as a place as any to mention the Edit Motion option found on the top of the Motion Mixer tool bar. When you have a motion selected, this option enables you to return to the original Layout animation and make corrections if necessary. This enables you to tweak the motions very effectively.

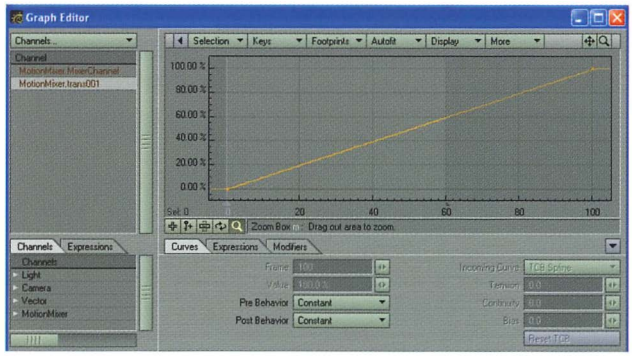
You should see a combination of the two motions that shows the vector object spinning down to the 90 degree plane. This is kind of neat, but you don't have any real control over the transition. We can take care of that. Select the 90 flip motion bar to highlight it. Now select the Add Transition option from the top Motion Mixer tool set. Click the 360 motion bar. You should see another block between the 90 and 360 motion bars, as shown in **Figure 14**.

**Figure 14: New Transition bar between 90 and 360 bars**




Right click on the newly placed Transition bar. The Transition Graph Editor will appear, **Figure 15**.

**Figure 15: Transition graph editor**




If you recognize this, you're right, it's the good old Graph Editor. Here you will be editing the transition between the two motions in Motion Mixer. The axes are slightly different from those you may be

used to. This graph shows the relative percentage of the transition that you are adjusting. There is no time line or number of frames. It represents how much mixing is going on. All the bells and whistles of Graph Editor are here. If you want to match the pre- or post-behavior properties you added in Motion Mixer, this is where you would do that for the transition elements. You can use the Reference manual to answer any questions you may have about this Graph Editor.

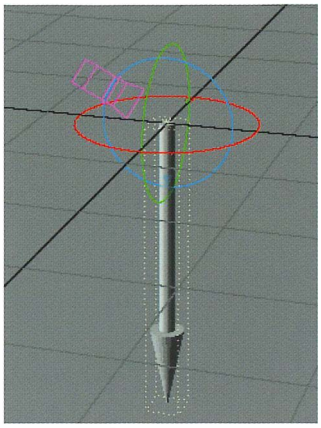


Figure 16: 180 degree flip

Let's throw in a third motion. Disable the Actor active button in Motion Mixer. In Layout, starting from frame zero again, create a 10-frame animation of the vector going though a 180 degree flip as shown in **Figure 16**.

Go through the same process as you did for the previous two motions to add this motion to Motion Mixer. Change the Channel Edit so that only the bank is active, just as you did for the 90 flip. Add a transition from the 360 to the 180 in the same fashion as you did for the 90 to the 360. You should end up with something like **Figure 17**.

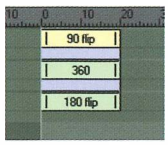



**Figure 17: With 180 degree flip added**

Activate the Actor to see what the result of this is. Yuck! What's going on? Well, what's going on is the true power of Motion Mixer (in my eyes anyway). Open the Channel Editor again and deselect the 90 flip motion so that only the 360 and 180 flips are active.

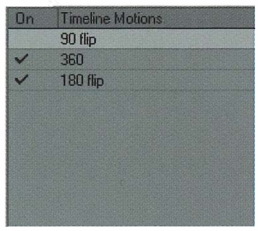



**Figure 18: Deactivate a motion**

Now scrub the animation. You should see the vector go through the 180 degree flip spiraling all the way down. This is how I achieved the requirement of on-the-fly changing from a 90 to a 180 degree flip. Thanks NewTek.

The next challenge turned out to be the easiest to solve. I needed these actions to repeat over time in an endless cycle. This of course was solved using the pre- and post-behavior options.

Right click over each of the separate motions to get to their repeat functions. For this project I selected the Oscillate function for both of the flips because I wanted each of them to return to its original position. For the 360 degree motion I chose the Offset repeat function so I could have the rotation function independently from the flip. If I needed two rotations (i.e. 720 degrees) this option would take care of that. I could simply retime the 360 degree spin as I needed it.

**Figure 19: Final Mix**

Motion Mixer is a very powerful tool. I couldn't go through all the bells and whistles in one tutorial, but I hope I have sparked some interest in at least getting you to try it. I think Motion Mixer will help a great deal in dialog applications as well as complex mechanical motions. Imagine having a library of facial expressions to add and blend as you need them, or perhaps a set of karate moves you wish to put together in endless combinations. All this is made possible with Motion Mixer. Once again, thanks NewTek!

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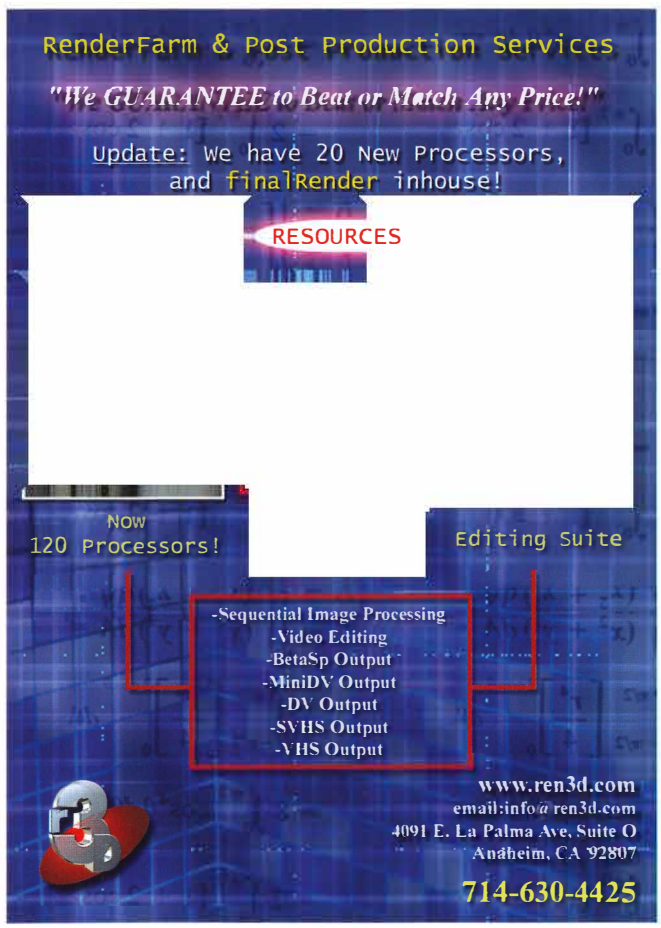

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# A First Look At messiah:studio

## by Ron Wolfe

My eagerly awaited copy of messiah:studio Advance arrived on November 2, and I spent some time to review the changes that have been made from its predecessor, project:messiah. Even for an Advance version, Studio is impressive, with a fluid, streamlined feel and an enormous set of new controls. One of the most anticipated additions is Render. In this article I'll take a look at the initial set of controls for this global illumination renderer.

A disclaimer before you read this article. The pmG team has stressed that the Advance is a preview version of the software. They have noted that they have core features in place and will be adding many more goodies as these features prove to be bug free. On that note, once I had my copy of Advance set up, it proved to be very solid already. I have only had a couple of crashes over the course of five days of using the software. Keep in mind that some features and screenshots shown here may be changed and improved for the final version (which will be even better).

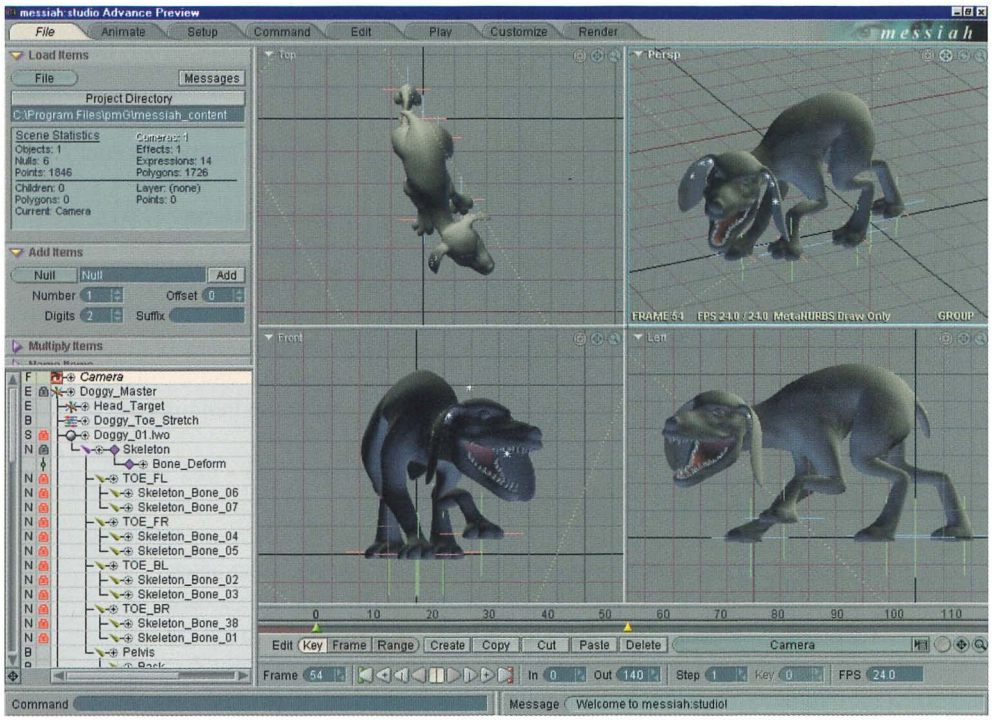



**Figure 1: messiah:studio quad view**

### Interface

One of the first things I noticed about Studio was that pmG has kept all the best parts from the previous interface while adding additional functionality and organizational features to make the new interface even better than before. The interface has a softer, cleaner feel to it as you work through its well-organized tabs and sub-tabs. Invariably, one of the first things a new user mentions is the ease of working with the messiah interface. I've got to agree.

For the animation window, the user now has the option of using a quad view (**Figure 1**) instead of a single view. You can toggle this feature with a quick tap of the **q** key. There are even more view features to follow.

Previous messiah users are familiar with the F key features that enable you to resize the size of the panels in relation to the animation window. Now pmG has added **F4** and **F5** for more control. F4 sizes the panel portion of the interface larger than F3, while F5 toggles open a tray control that will eventually hold your messiah scripts. In addition to these quick keys to resize the interface, you can now drag the panel borders to resize it to your precise needs.

In previous versions, scrolling through the drop down menus and hierarchy windows could get tedious. PmG has added several nice features to make this much easier. The user can still use the dropdown menus, but now you can also choose to display the menu as a scrollable window. You can then scroll through the window using the new scroll gizmo. This is a crosshair icon in the lower left corner of the window; you use it by clicking and dragging with your mouse. This is a much nicer method because you don't have to physically grab the slider bar any more, and you are in complete control of how fast the selections go by.

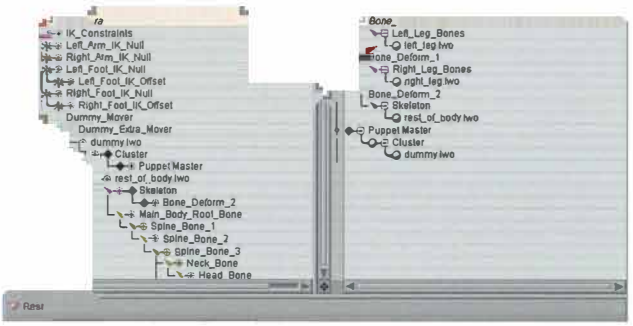
## Setup Mode

A Setup Mode has been added and is accessed through its own tab. Now everything in the scene enters and exits Setup Mode at the same time. This eliminates the linking process that was necessary with previous versions. This feature has greatly simplified the activation of complex rigs, and in my opinion is more intuitive.

Inside the Setup tab, there are sub-tabs that control the various parts of Setup Mode. The Items sub-tab (**Figure 2**) is where you can create Tools and Effects for your rig. The Effects sub-tab (**Figure 3**) is where you manage the targeting of these effects. This replaces the Effects-Modify sub-tab from the previous versions. The Tools sub-tab lets you manage the linking/target relationship and is organized by the tool you have selected. For example, if you are managing your sliders, you can select Slider as the Tool and you will have access to just sliders on the right panel. The other effects will not be in your way, cluttering up the panel. The Groups and Lists sub-tabs are not active or documented yet.

**Figure 2: Setup tab, Items sub-tab**

**Figure 3: Setup tab, Effects sub-tab**




## Effects Parameters And Additions

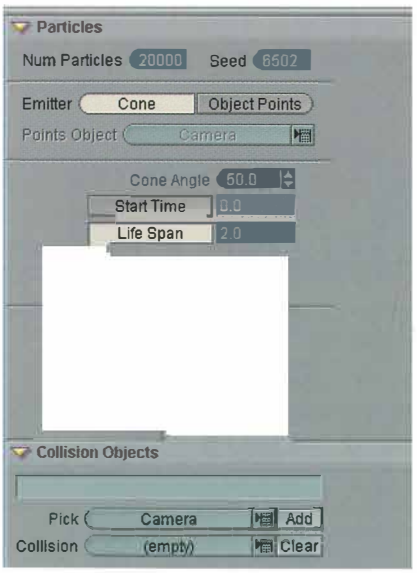
### Bone_Deform

Bones were one of the best features in the previous version, and pmG has enhanced them in Studio. Some new real-time features are visible in the setup panel for bones, though these features are currently inactive in the Advance release. These features include real-time Muscles and real-time splitting (**Figure 4**). This should eliminate the previous requirement to build expressions for muscles.

**Figure 4: Real-time Bone features**

You can now drag the bones from one character onto another character. This is a great feature. In the old version, you might rig two characters, then decide to rig a facial skeleton for Character A. After finishing the facial rig for Character A, there was no easy way to also use it for Character B. You had to either manually rebuild the rig for Character B, or resort to the tedious process of text-editing the scene file. With this new feature, you can simply copy and select the facial bones under the skeleton for Character A, then drag-and-drop them on the skeleton for Character B. Now the bones are part of Character B's skeleton, just as if you had built them there. This feature has to be used to be appreciated.

**Figure 5: Particles effect.**



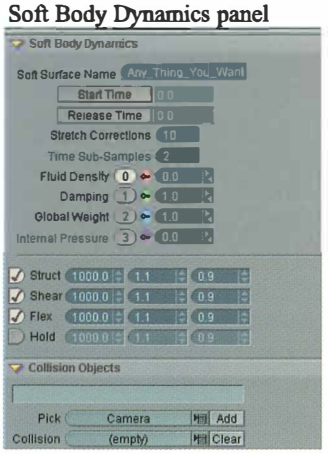

### Particles

This is a new effect for Studio (**Figure 5**). The particles have many keyframeable parameters, are aware of the deformations of the character/object, are affected by Forces, and have collision abilities.

### SoftBody Dynamics (Figure 6)

This has been reworked with keyframeable parameters, user-chosen surface names and improved collisions and dynamics.

**Figure 6:**
**Soft Body Dynamics panel**



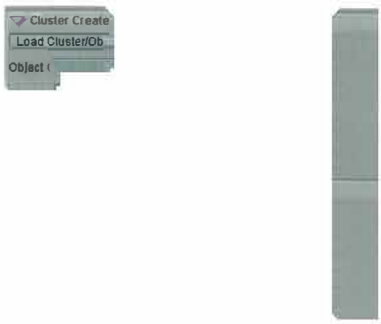



Figure 7: Cluster Create, Points tool panel for Puppet_Master effect

### Puppet_Master Effect

This is still set up in the same manner, but I wanted to show you its setup panel and the new Points tool panel (**Figure 7**). It's currently inactive, but can you take a guess at what it might be used for? How about point-level animation? The pmG team deserves credit for noting the many user requests for this feature.

### Forces

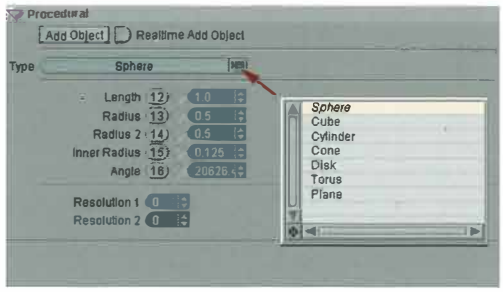
Forces can affect particles and softbodies. The current choices are Wind and Jet (**Figure 8**).

Figure 8: Force Wind and Jet effect panels

### Procedural Objects (Figure 9)

This is an interesting one and I don't pretend to understand it completely, but the docs mention that one use for this is with the new texturing system. There are several shape choices that include keyframeable parameters. Interesting.

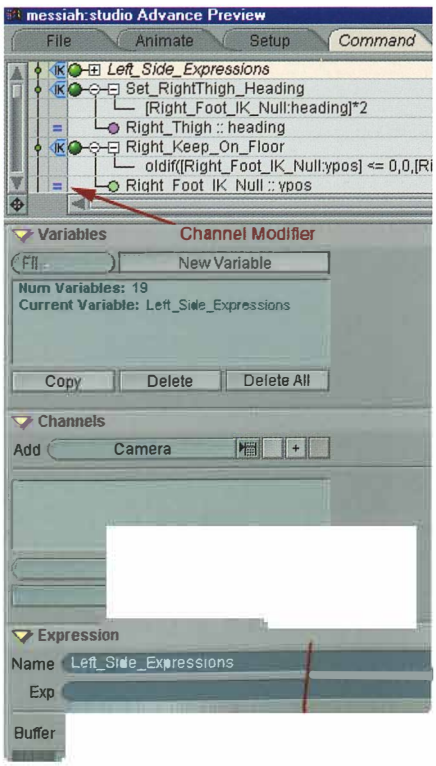
Figure 9: Procedural Objects panel.




### Spherize

This is a new effect and I can best sum it up as a user-sized local force field that can affect your character's geometry. One use is to maintain the volume of a joint because the skin slides over it. It can also be used for body parts (toes and fingertips) that expand as they come in contact with solid objects. As an example, place Spherize effects in the tips of the fingers; when your character places his hand on a table, you can have the tips react realistically by spreading out slightly. This effect can be animated with its parent null object. Cool.

Figure 10:
Expression Engine.




### Command Tab - The Expression Engine

This is where messiah's expressions are built and analyzed (**Figure 10**). There is a large list of pre-made expression functions (I noted almost 200) for you to insert into your rig, or you can easily build your own based on your needs. An improved interface is now available that makes the process much easier and cleaner.

One new feature in the Expression List is the Channel Modifier. The available modifiers are Equal (=), Add (+), Subtract (-), Multiply (x) and Divide (/). This controls how a channel is affected by the expression.

Two new features were requested by the messiah users many times and it is nice to see pmG include them in Studio. Expressions can now be grouped and collapsed. This means that a rig with 400 expressions (not uncommon) does not require you to search through the entire list to find something. You can group your expressions in any method that you choose. You could have all the expressions for the character's left arm under Left_Arm_Expressions, for example. Pretty simple. They have also changed the way a new expression is inserted into the list. Select any expression in the list and make a new expression and you will see it inserted after the selected one. With this and grouping, users should be able to fly through the new expressions list.

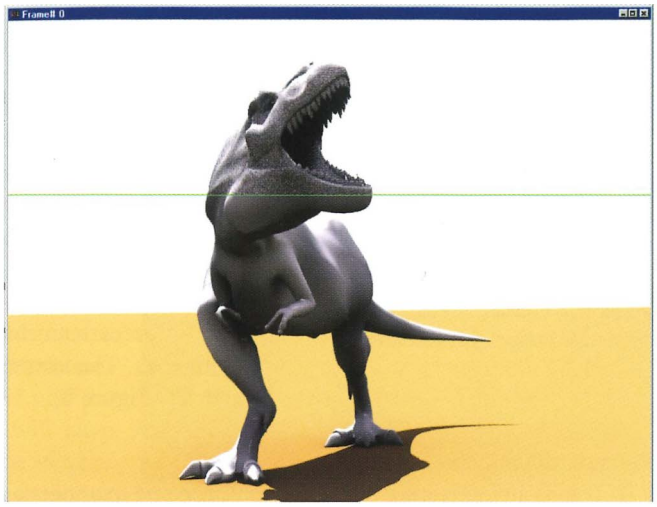
### Edit, Play And Customize Tabs

The Edit, Play and Customize Tabs are currently unchanged except for one important feature: MotionClip was not included in the Advance, and for a good reason. It is being completely reworked and will eventually become a part (though you might not recognize it) of the new Non Linear Animation system. This is going to be a big feature and is eagerly anticipated.

## Render

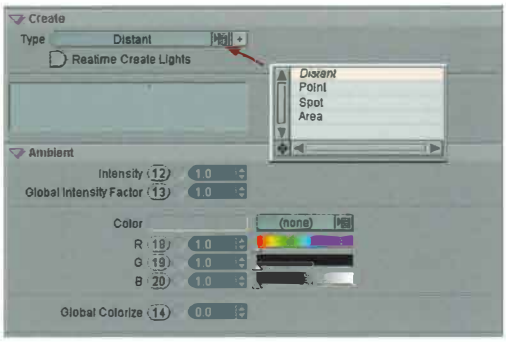
This has been what all the questions have been about, and I think most will agree that pmG's first offering of Render is above the expectations of messiah users. There are so many controls and settings with this initial version that I would be hard pressed to describe them all, so I have simply included many images of the interface and will let those provide most of the information. However, I will point out the highlights of this new rendering system. **Figure 11** shows the first antialiasing pass in progress on a basic render.

Figure 11: First antialiasing pass in progress on a basic render.



Studio provides a full global illumination rendering system complete with an advanced shader system, sophisticated lighting choices, environment controls and much, much more.

Figure 12: Ambient light controls




## Lights

There are four choices with Advance: Area, Spot, Distant and Point (**Figures 12 & 13**). There are also Ambient light controls. Many areas are still being developed but the basic concept is of a Light Tool/sub-tool relationship. You can think of the Light Tool as the Master. Just imagine being able to create a battery of various lights under a Master light and having control through the Master.

Figure 13: Light types

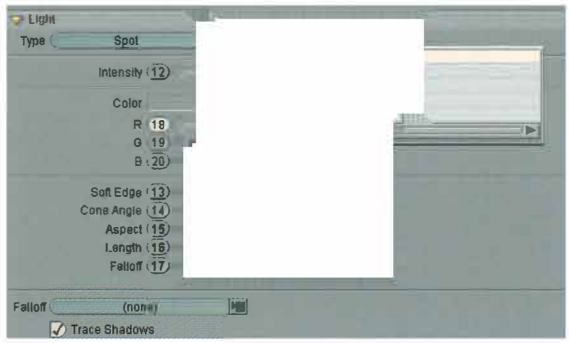
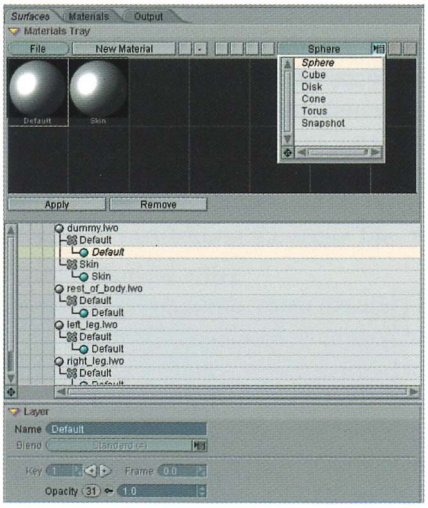


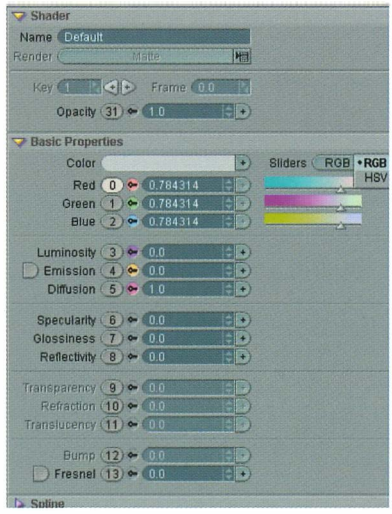

Figure 14: Surfaces Sub-Tab.




## Surfaces Sub-Tab (Figure 14)

A Materials Tray shows a preview shape with your surfaces. There are a variety of preview shapes you can use, but this feature was still being finalized and was not completely implemented in the Advance. The Objects and Lights section is also being worked on, and will control attributes such as render and shadow choices. Layers, along with a selection of Blending modes are also available. Many parameters are keyframeable and there are spline controls for your keyframes. The Materials List is an area where you can visually organize your surfaces. Your Shaders can be named anything you desire. You can also set surface attributes such as render visibility, smoothing, smoothing angle and wireframe.

Figure 15: Materials Sub-Tab.



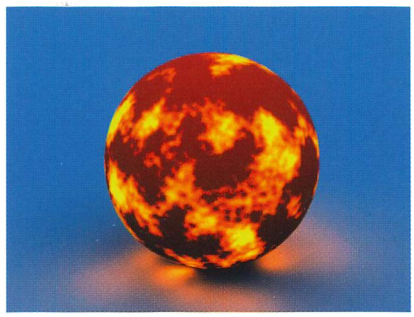

## Materials Sub-Tab (Figure 15)

One of the first things you'll notice here is the Shader Flow shelf (**Figure 16**) that opens up above the Motion Graph. This provides an excellent visual environment to organize your shader nodes and build your shaders. You can also name these anything you like to keep them organized.

Figure 16: Shader Flow shelf.

Basic Properties are just that. Here you have access to all of them, and note that almost all of them are keyframeable. Of special note is the Emission property. This controls how much light the material gives off (**Figure 17**). This is not to be confused with Luminosity; Emission will actually light up other objects around it. The standard Texture Map controls are provided, including transformation controls and support for UV mapping. You can spend a lot of time in this area.

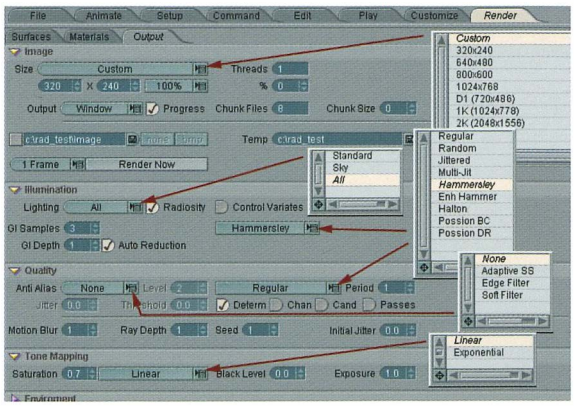
**Figure 17: Emission property example rendering.**



**Output sub-tab (Figure 18)**

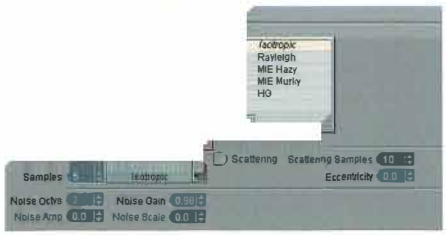
The Image section is where you make choices that determine image size, how it is rendered and the output format. You currently have three illumination choices: Standard, Sky, and All. Sky uses global illumination, Standard adds traditional ray tracing and All uses both. You can select how many Samples are used for the global illumination, as well as the GI Depth, which controls the number of light 'bounces.' There are many choices for the sampling pattern used for the global illumination rays. Quality has antialiasing and sampling method choices. Motion Blur is located here, as well as many other parameters. Threshold is the Adaptive Sampling Threshold used in the antialiasing. Tone Mapping is a way of adjusting the exposure of the image; it is similar to adjusting image levels in Photoshop.

**Figure 18: Output Sub-Tab**



The Environment section has quite a few features (**Figure 19**). Ground sets the color thrown by the ground plane, while Sky sets the atmospheric color of the light from the sky; this is not the same as the sky color. Volumetric fog is used with spotlights and you have many parameters to control it.

**Figure 19: Environment controls of Output sub-tab**



**messiah:script**

Currently, messiah:script is a command language, but it will eventually become a full programming language. Scripts are currently accessible by expressions, other scripts, and the command line. Scripts can be built with a standard text editor and saved to the messiah scripts folder. At program startup, they are automatically loaded and available.

**Develop**

Develop is still being completed and was not included with the Advance version of the software. With it, third-party and user add-ons can be made. The only limitation is the developer's imagination. Develop will use C language and includes controls to build your interface and high-level access to messiah's functionality. Check out pmG's website (below) for more information. This will probably be one of the best of the new features and a dream system for developers and users.

**Summary**

That wraps up our first look at messiah:studio. Remember that at the time of this writing, the software was still being developed, tweaked and enhanced. It will only get much better. This is an exciting time to be a messiah user. You can keep abreast of Studio's status by referring to pmG's website at

**www.projectmessiah.com**.

*Ron Wolfe is a freelance LightWave and messiah enthusiast who enjoys all facets of the animation process. You can contact him at* **rwolfejr@woh.rr.com**.

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# SLUDGE

## Creating a Character Head

### by Jason Stempel

Breathing life into our favorite LightWave characters is why so many of us have enough heart to spend those sleepless nights and long weekends staring at our computer monitors. It's worth it! One of the most effective ways to accomplish this is with powerful facial animation. If you're a LightWave artist with intermediate or advanced modeling skills but are intimidated by Layout's character animation tools, don't worry. Most of the tools needed for creating expressive facial animation can be found in good ol' reliable Modeler.

This article features a lil' devil character named Sludge that I created for an animation project I'm currently working on. I learned and developed a heck of a lot of valuable technique to improve the speed of my workflow when creating Sludge's facial endomorph targets, which I will share with you in this article.

The foremost tool you're going to be using to create facial morph targets is the endomorph tool in Modeler. This tool can be found at the bottom right corner of Modeler and is represented by the capital letter M. Creating new endomorph targets is easy. First click on the (M), then scroll down on the bar labeled [Base] until it reads [New]. Name your endomorph and you're all set to go.

In order to convince an audience that your character is speaking, you must create phoneme endomorph targets. A phoneme is the position of the mouth made when pronouncing the sounds which comprise words. The phonemes I created for Sludge are:

Mouth.—-OOOH,WWW
Mouth.—-MMM,PPP,BBB
Mouth.—-SSS,TTT
Mouth.—-LLL,NNN,DDD,TH
Mouth.—-CH,GGG
Mouth.—-EEE
Mouth.—-FFF,VVV
Mouth.—-OPEN

You may have noticed from my list of phonemes that many of the mouth shapes are used for more than one speech sound. There is no one 'right' set number of phonemes an artist must create for every character. Individual characters express themselves differently depending on their creator's and animator's preferences. Sludge is the lead character of my story and a motor mouth; therefore, he needs a wide variety of facial expressions for emotion as well as phonemes to best deliver his dialogue to an audience. By contrast, another character in the project (named Fat Frankie Beans, **Figure** 1) creates noises while never actually uttering a word. Frankie has lots of facial expressions with minimal phoneme morph targets, because all he does is whine, cry, whimper, and mumble. The beauty of endomorphs is in all the options the different targets offer when mixed together using LightWave Layout's morph mixer tool or (my personal preference) the morph blender tool found in project:messiah.

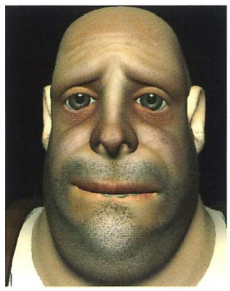


**Figure 1:**
**Fat Frankie Beans character**

A reliable way to convey emotion is through eyebrow movement. These are the eyebrow endomorph targets I created for Sludge:

Eyebrows.—-Serious
Eyebrows.—-Surprised
Eyebrows.—-Sad

For final touches I created some endomorphs which would be used sporadically to add some realism.

Eye.—-Blink
Jaw.—-Forward
Jaw.—-Left
Jaw.—-Right
Sneer

Asymmetry for the jaw targets adds a nice touch of realism to any character's speech patterns. If, for example, Sludge was scared and cried out "OH NO!" I might morph his jaw to the right and blend between the Mouth.—Open target and the Mouth.—-OOOH target for the beginning of the word "OH" (as shown in **Figure 2**). Then for the end of the word I may only have the Mouth.—-OOOH target active. Practice saying "OH NO!" as if you were scared with your jaw shifted to the right. Then try it again without the jaw shift. Notice how much more expressive and organic the movement is with the jaw shift?

After I created symmetrical targets for Sludge's Eyebrows and Sneer, I copied these endomorph targets using the Copy Map feature located under the Map tab. I renamed the targets (specifying left or right) selected all the points on the opposite side of his face, and clicked the clear map button (which also

Figure 2: Sludge character showing Mouth Open and OOOH endomorphs blended with jaw right endomorph.

Figure 3: The (.) found in the endomorph name helps to organize these targets in the morph mixer in Layout.

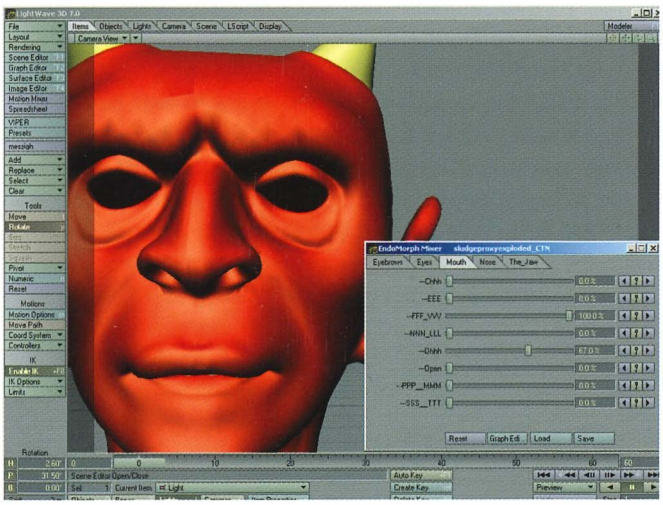


Figure 4: An asymmetrical endomorph.

is found under the Map tab). This reset the selected points' positions to the default of the base model. The result is an asymmetrical endomorph.

**Preparation**

You'll be doing yourself a huge favor by organizing yourself and your character model properly before getting started with morph targets. It will help you avoid massive hassles when you are knee deep in Endomorphs.

Keep a makeup mirror which stands on its own base and swivels on your computer desk always. There will never be better reference for creating facial morph targets than looking at yourself in the mirror.

Before you even begin to think you might almost want to try to create an endomorph target, make sure your model is sized properly. The last thing you want to do is have to deal with the scale morph tool. Yes, it was created as a workaround, but it'll hurt ya. If you already have the scale of your model wrong ("oops"), just remember to scale your object numerically and to scale the morphs numerically, keeping everything consistent. Most of all, write that magical scale percentage number down on a post-it note and stick that sucker to your monitor.

Model your character with the mouth closed. You may even want to model the eyes closed, depending on how much of a perfectionist you are. If you model the character with its mouth open you'll be real disappointed when you rotate the jaw closed, because the character's lips won't meet naturally. I suggest modeling the eyes closed to avoid texture skidding on the upper lid. Since most of the time our eyes are open, and it may be difficult to imagine the endomorphs you're creating with the eyes closed during the entire endomorph creation process, here's a simple work-around solution I had to learn the hard way.

After you have created all your targets to your satisfaction, use the Apply Morph tool (found at the bottom left of the modeler screen under the MAP tab) on your Eyes.—-Blink target. After you've applied the morph, save the object as something like Base_Textured_Character.lwo. After you save, be sure to undo the apply morph. Then save the object with its eyes open, naming it something like Base_Eyes_Open_Character.lwo. After you've finished texturing your model with the eyes closed, load both models into layout. In the Object Item Properties panel, morph the Base_Textured_Character.lwo into Base_Eyes_Open_Character.lwo one hundred percent. Then dissolve the Base_Eyes_Open_Character.lwo one hundred percent. Animate the Base_Textured_Character.lwo and, Ta-Da! No more texture skidding on the eyelids.

For organic characters use subpatches, and keep your polygon count low! Notice how low poly Sludge's wireframe

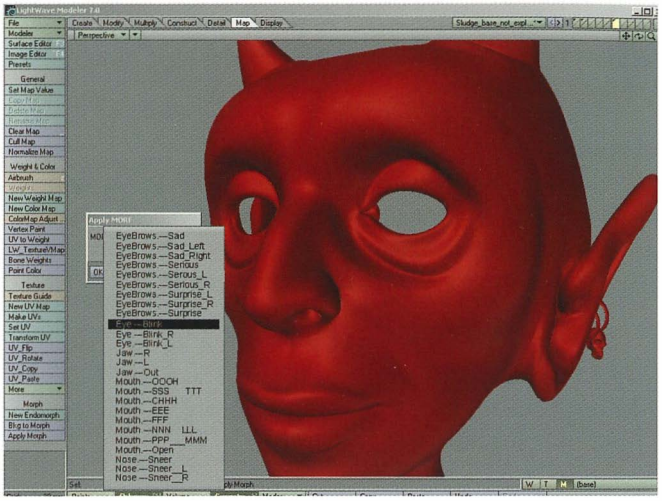


Figure 5: Note that when I applied the Blink Endomorph, my Base target was listed active and I only had to select the Eye.—-Blink target from the list in the Apply Morph Tools selection list.

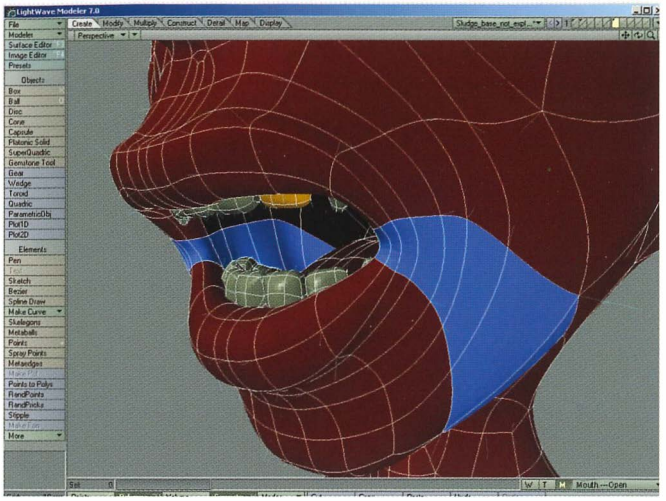


Figure 7: An extra row of polygons between the upper and lower lips prevents stretching when the jaw rotates open

is, yet when he's subpatched and textured I've achieved a considerable level of detail. High poly models are BAD BAD BAD! They animate slowly and are a nightmare when you are creating endomorphs, forcing you to tweak ridiculous numbers of points individually.

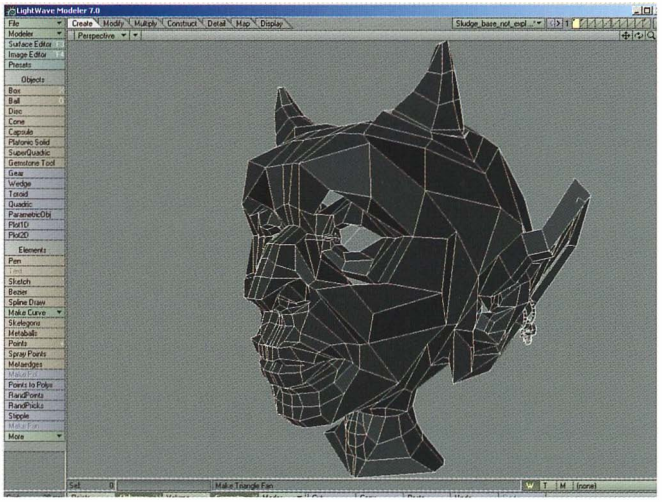


Figure 6: Low polygon count Sludge wireframe model.

Model your character's lips with a row of polygons between your upper and lower lips, **Figure 7**. I've found that without this row, the bottom lip stretches unnaturally when the jaw is rotated open.

Keep your character's eyeballs and upper row of teeth in separate layers out of the way from the rest of the model. Having these points and polys not visible will make your selections on the rest of the model even cleaner and faster. If you need to see these parts of the model you can always template or activate their layers.

Place a point on a separate layer to use as a landmark for the jaw's pivot or hinge. Every time we open our mouths our jaw rotates around the same point in space. Using a point as a landmark for this hinge is great since points don't ever render in Layout.

Finally, point selection sets and polygon part names are your best friends. Abuse these tools, which can be found under the Display tab in the grouping subtab. Create point selection sets and polygon part names for equivalent geometry on your model. An easy way to accomplish this in sync is by first selecting a group of polygons you wish to isolate as a part name. Hide the unselected polygons and name the selected polygons as the polygon part name of your choice. Switch to point selection mode and highlight all the points. Create the point selection set with the same name as its polygon part name equivalent. Unhide all the geometry and repeat this process until all of your polygon part names and point selection sets are finished.

The polygon part names and point selection sets I created for Sludge are: Bottom_Lip, Upper_Lip, Upper_Eyelid_R, Upper_Eyelid_L, Lower_Eyelid_R, Lower_Eyelid_L, Eyebrow_L, Eyebrow_R, and The Jaw. Make sure you include the bottom teeth and tongue in the jaw selection set, since they also rotate from the same pivot as the jaw and with the jaw. You might even consider keeping the tongue and bottom teeth on the main layer with the majority of your character.

### Getting Our Hands Dirty

LightWave Seven has a few great new tools like Spline Guide and Airbrush Morphs, which proved to be very useful when creating Sludge's targets. However, there still is nothing like LightWave Modeler's established power tools to get the job done quickly and effectively. Please don't misunderstand that when I mean quickly, I'm not talking 5 minutes' worth of

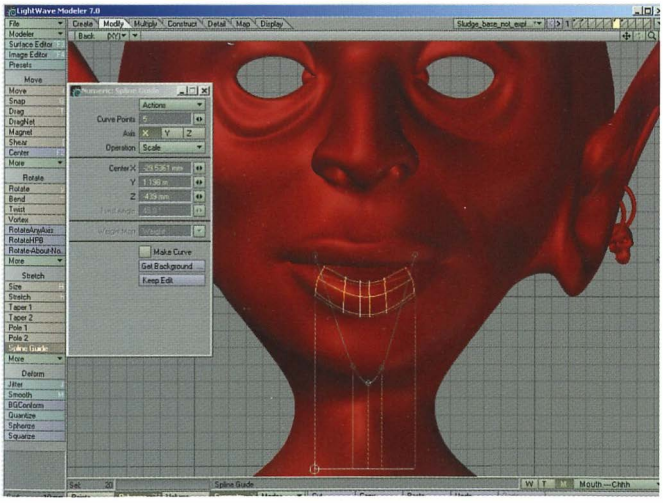
work. You'll find, as I did while writing this article, that there are many little tweaks you're going to need to make in order to create a convincing phoneme target as well as a target for expressing emotion. My philosophy is that it's better to move larger groups of points around first to shape the general desired look and then to refine the target by tediously pushing points individually afterward. The modeling power tools I'm a fan of are Pole, Vortex, Taper, Twist, Stretch, Magnet, and Smooth. The following are two quick demonstrations touring the process I've grown comfortable with while creating Endomorph targets for Sludge.

### Creating the Mouth.—-CHHH Phoneme

Assuming you've organized one of your own models according to my suggestions, here is my quick and dirty method for creating the chhh phoneme. I'm sure that after you have created this target using this method you're going to really push this new tool called Spline Guide.

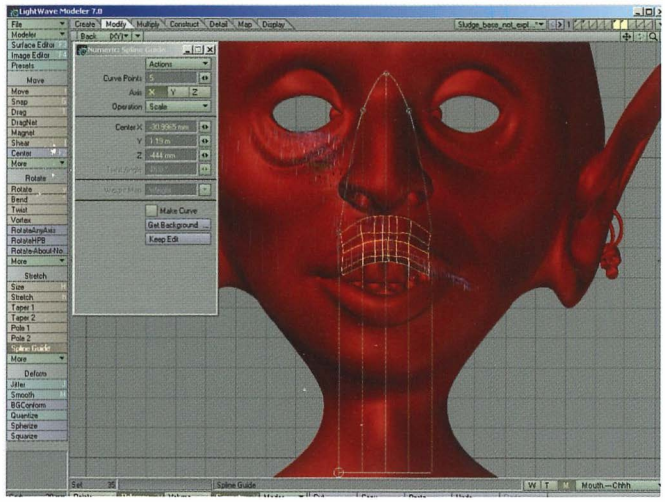
Create a new Endomorph target named Mouth.—-chhh. Select your polygon part name Bottom_Lip. Deselect the outer edge polygons of the bottom Lip and activate the Spline Guide tool (found under LightWave Seven's modify tab). Click in either the front or back view (depending on which direction your character is facing) and press the **n** key on your keyboard to open the Spline Guide's numeric options, **Figure 8**. Set the number of curve points to between three and five. In the Modeler window, pull down on the tool's main handlebar, centering the tool's range far below the lip. Drag the curve points down to form an arc you're satisfied with.

**Figure 8:**



Repeat this process for your polygon part named Upper_Lip. Remember to deselect the outer edge polygons, but this time also select the polygons just above the Upper_Lip, **Figure 9**. Move the Spline Guide's curve points up in your Modeler window to deform the Lip in the correct direction. When you're satisfied with your results with the Spline Guide tool, either use the Smooth tool or actually drag the points while in Symmetry Mode in all your viewports until you believe it's perfect.

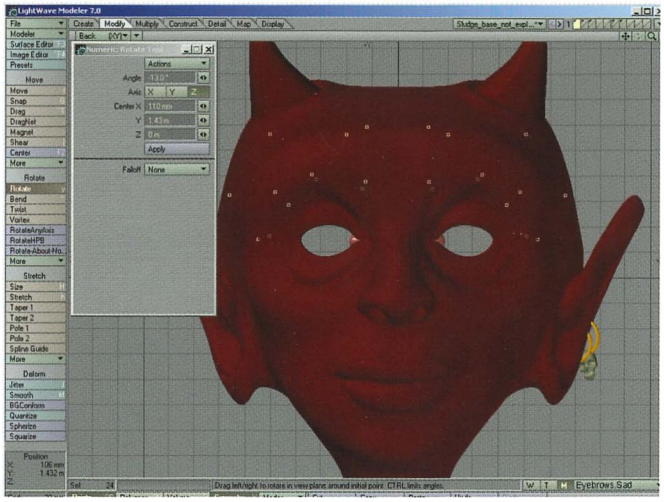
**Figure 9:**



### Creating the Eyebrows.—Sad Facial Expression Target.

Create a new endomorph and name it Eyebrows.—-Sad. Select both your eyebrow point selection sets. Make sure symmetry mode is activated, then select the rotate tool. Place your cursor over the side of the head to *your* right on a point at the bottom far right edge of the eyebrow. Rotate clockwise between ten and thirteen degrees.

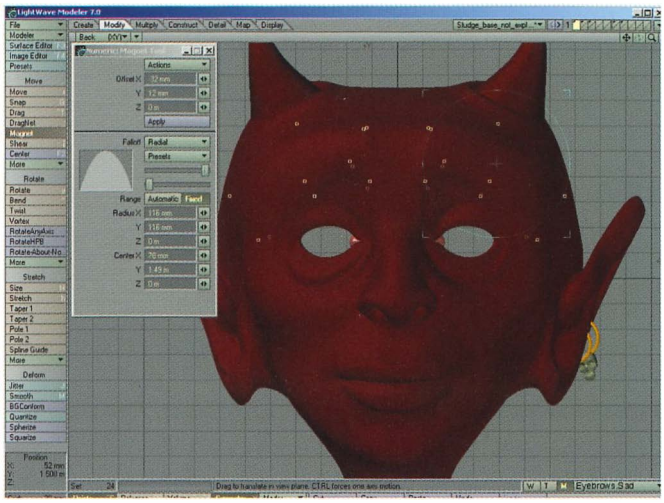
**Figure 10: Rotating the eyebrow selection set.**



Select the magnet tool and draw out a circular area of influence with the right mouse button. Press the **n** key on your keyboard to open the numeric options for the magnet tool (**Figure 11**), and drag the top slider bar to the far right, changing the magnet's brush style to a smooth dome arc. Place the center of the area of influence over the middle of the right eyebrow point selection set and then, using your left mouse button, magnet the points to the left upper center of your

character's head. Place the magnet's area of influence to the upper right of the selection set points, still on your right side, and magnet these points down in the direction of your character's nostrils, **Figure 12**.

**Figure 11: Start of Magnet tool operation.**



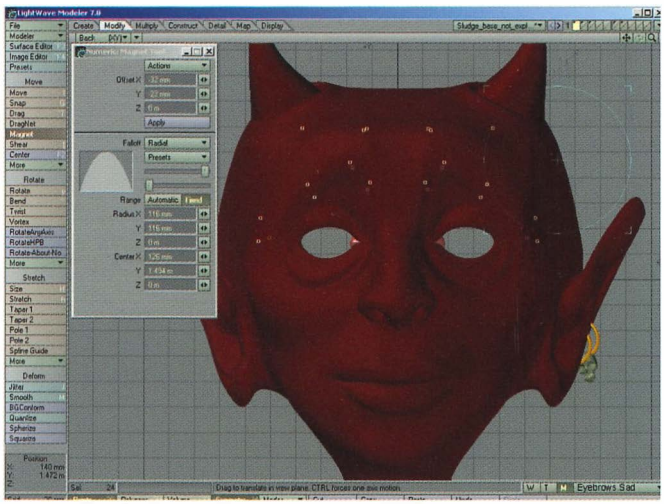


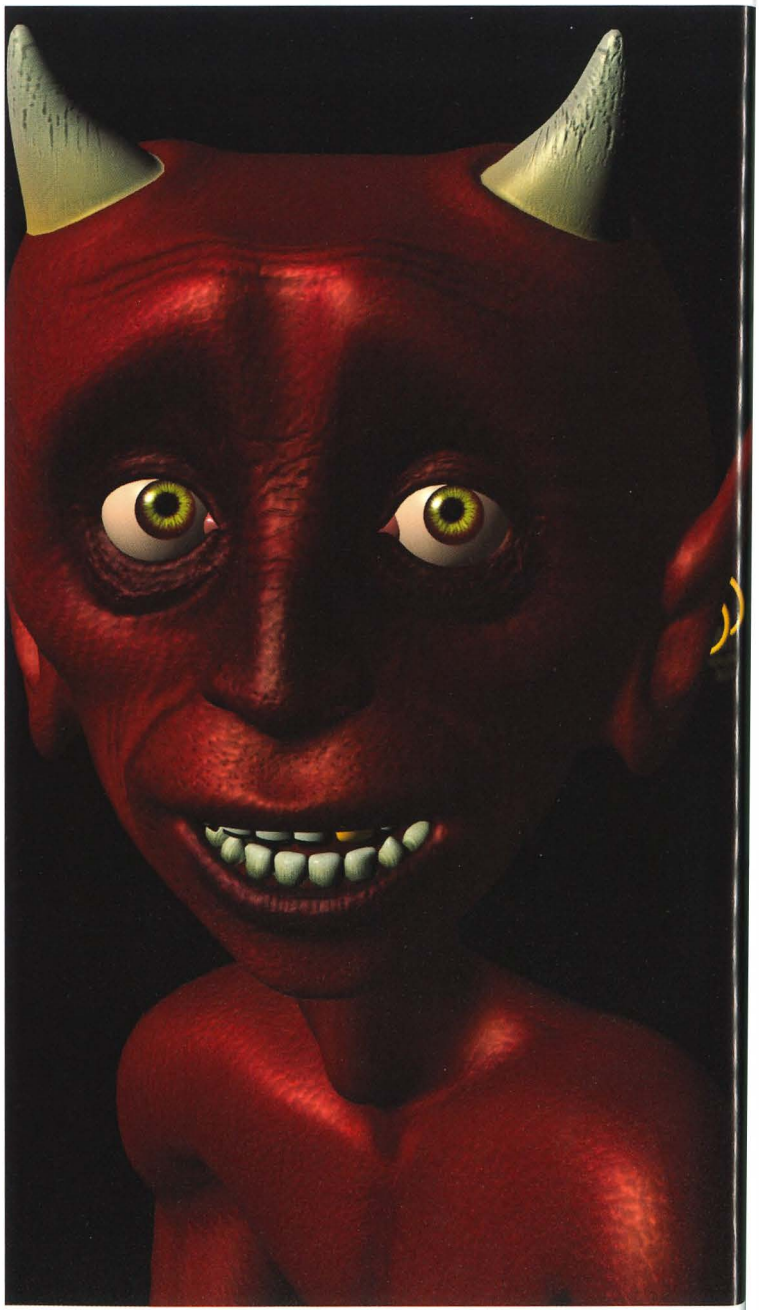
**Figure 12: Results of Magnet tool operation.**

Select the Drag tool from the modify tab and tweak the points which are just above the nose, moving them just a bit closer to the line of symmetry. Great! You've created a sad facial expression for your character.

After you've created your character's facial expressions and phonemes you should run some tests to see if the endomorphs read properly, blending during animation. Load your character into LightWave's Layout. In the Object Item Properties under the Geometry tab, set your subdivision order to Last. Under the Deformations tab, load Morph Mixer Displacement. Double click the Morph Mixer. Organized tabs containing slider bars will appear, which enable you to blend between your morph targets. Make some test animations of your targets blending between each other such as La, La, La, La, Fa, Fa, Fa, Fa, Me, Me, Me, Me, etc.

I hope this article was an interesting and informative read. I would very much enjoy receiving any AVIs, meshes, questions or comments any readers wish to ask or share. Please don't hesitate to email me at **jasonstempel@hotmail.com**. Best of luck to everyone!

*Jason Stempel earned his BFA in Sculpture at The New York State College of Ceramics at Alfred University in 1998 with a Minor in Art History. Post graduation he taught digital animation at two schools on Long Island, New York. Jason will be moving to California in December of 2001 to attain his dream of becoming a professional digital artist.*



techtv

# Hairy Prairie: Making Grass the Sasquatch Way

## by Cailean Babcock

In working toward the goal of creating ever more sophisticated animations, animators are in constant pursuit of software that will enable them to reproduce reality's minutiae. The latest advancement to come along is the fur shader, which has helped CGI artists create believable characters that blur the line between reality and fantasy. However, fur shaders open up more possibilities than characters alone; with a little creative coloring and styling, fur shaders can be used to mimic other things as well. In the case of this tutorial, a grassy field.

Enter Worley Laboratories' Sasquatch, arguably one of the best fur shaders around, from one of the hottest plug-in providers in the industry. Sasquatch's advanced controls and killer render engine enable the animator to create sophisticated fur (and grass) effects in a matter of minutes. Its animation controls enable you to reproduce such effects as wind and other physical interactions, to a level of subtlety and sophistication that will amaze you.

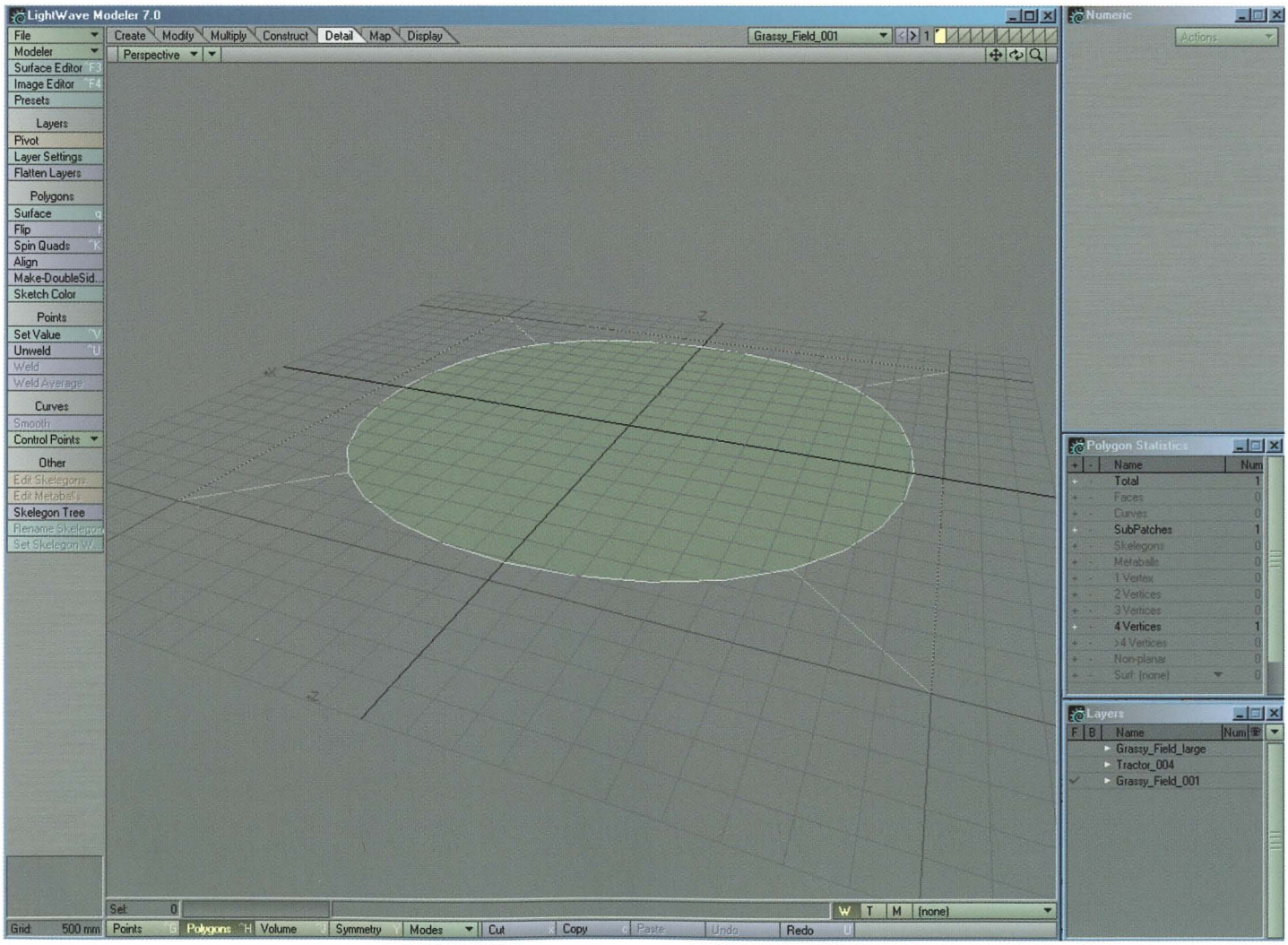
We're going to do something a little more elaborate than a freshly-cut lawn. We're going to go for the wild grass tussocks and hummocks that you might see in a open field in, say, the American Midwest (Oklahoma, to be precise; hey, go with what you know).

### The Lay of the Land

Healthy plants require good soil, so let's start by creating some ground for our grass to grow on. In Modeler, activate the Box tool in the Create tab. From the Numeric panel ('n' on your keyboard), select Activate from the Actions drop-down menu. Enter 10 m for the Width and Depth values to create a flat plane 10 meters across. This is a rather small chunk of land, but will serve our purposes just fine.

Hit the tab key to turn this object into a subpatch surface. You should see the square suddenly turn into a round circle, with guide-lines reaching out to the original points as shown in **Figure 1**.

**Figure 1: Finished Ground Plane.**



Finally, type 'q' to bring up the Change Surface dialog. Give this surface the name of "Ground" (original, I know). Click OK to apply this surface to the object and save it as "Grassy_Field_001.lwo."

Load the Grassy_Field object you just created into Layout. Place the camera at Y: 1 m Z: -6 m with a pitch of 5 degrees, to give you a close-up view of the proceedings. Create a keyframe here. Go to frame 10 and create a second keyframe at Y: -7 m and Z: -21 m with a pitch of 20 degrees; this will be our overview shot. Open the Camera Properties and set the image resolution to "VGA (640x480)" and the camera zoom to 6.0. Select "Low" for your Antialiasing level. Finally, make sure the Adaptive Sampling box is turned off, as shown in **Figure 2**. Sasquatch renders will take longer and produce unusable renders with Adaptive Sampling turned on!

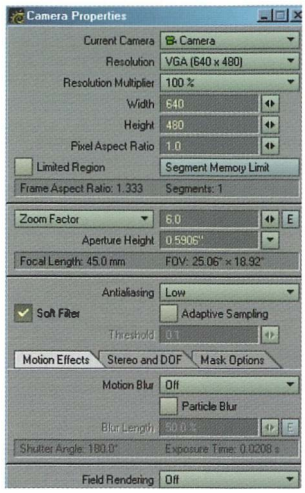


**Figure 2: Camera Properties.**

Let's modify our light setup so we have somewhat realistic lighting to illuminate our grass properly. For best results, you can go to the Keyframe website and download a light kit I've created for this project, LIGHTKIT_SunnyAfternoon.lws. Otherwise, here's a simple lighting rig to get you going.

First, add a null and name it "CTL_KEY." Parent the default light to it, and then rename the light "KEY." In the Light Properties dialog box, set the Light Intensity to 225% to mimic the intensity of natural sunlight (I'm sure you've heard this before, but the default setting of 100% tends to be a little underpowered when creating outdoor scenes). Set your Light Color to R: 255 G: 248 B: 223 to add a little warmth to the scene. Position the light at X: 0 m, Y: 0 m, and Z: -9 m. Set your Shadow Type to Shadow Map.

We created the CTL_KEY null to act as a handle for our light rig. Rotate it to H: 60° P: 70° and notice that our light is now positioned up and to the left of the center of our scene. Move the null slightly as well, to X: -1 m and Z: -50 cm. This will center it better on our grass object.

We're going to replace the default ambient lighting with another distant light. From the Items tab, click on Add>Lights>Add Distant Light and name this one "SHADOW_FILL." As the name implies, this light will act as our ambient light source to "fill" in the shadows of our scene with its own intensity and color values. Set this light's intensity to 50% and the color to R: 194 G: 170 B: 255. Set the Shadow Type to Off. Click on the Global Illumination button at the top of the light properties window to open the Global Illumination panel and set the Ambient Intensity to 0%. Go ahead and parent this light to the KEY light and position it at X: 0 m, Y: 0 m, Z: -20 m, and set the rotation to 0° on all channels.

Add one last distant light and name it "SKY_FILL." Position it at Y: 10 m with a pitch of 90 degrees. Set the color to R: 149 G: 195 B: 237 and the intensity to 50%; turn Shadow Type to Off.

From the Items tab, choose Add>Objects>Add Null to create a new null object. Give it the name "ROOT_LightKit" and make it the parent of CTL_KEY and SKY_FILL. This is handy for organizational purposes within the Scene Editor; you know where all of your lights are at any given time, and you can easily tuck them away by collapsing the hierarchy until just the parent null is visible. Save this scene as "Grassy_Field_001.lws."

Why all the use of numbers on the end of objects and scenes? This gives you the opportunity to save incremental copies of files, which can help in keeping track of revisions. Padding the version number with zeroes allows the files to sort correctly in your directory views. Most importantly, it gives you something to fall back upon if, for some reason, your latest version should become corrupted. It might not be vital for a tutorial, but it never hurts to stay in practice.

Now it's time to address our rather grassless grassy field. We're going to take care of the ground texture in short order and move on to the good stuff. There's no need at this point in getting too elaborate; after all, the majority of the model is going to be covered in grass, with only very small pieces actually peeking out here and there. In the Surface Editor, click on the surface named "Ground" and set the color to R: 149 G: 89 B: 54. This will give you a rich, reddish-brown color, reminiscent of the red clay soil of Oklahoma. Click on the color channel's T button and select the default texture layer. Set the Layer Type to "Procedural Texture." We'll use the default "Turbulence" procedural and set the color to R: 120 G: 75 B: 52. Lower the Frequencies to 2 and set the Small Power to .75. Finally, set the texture's scale to 75 centimeters across the board.

Because just one texture layer is boring and unrealistic, let's add another procedural. Select Add Layer>Procedural and change the Procedural Type to Dented. Set the Blending Mode to Multiply and change the color to R: 175, G: 111, B: 74. Enter 4 for the Octaves value, and select Gradient Noise from the Noise Type menu. Finally, set the texture scale to 2 meters and click on Use Texture to accept these changes. Go to File>Save>Save All Objects to save our surface settings to our Grassy_Field object.

Our grassy field is a bit flat, so let's add some displacement to it. Make sure the Grassy_Field object is selected and open the Item Properties window. Click on the Deformations tab and click on the T button next to Displacement Map. We'll be using another Turbulence procedural; this time, set the

Texture Value to 0.25, the Frequencies to 3, and the Contrast to 0.5. Set the texture scale to 5 m. Finally, click on the Y button next to Displacement Axis to make sure the texture is actually oriented in the right direction. Close this window by clicking Use Texture, and click on the Geometry tab. Set the Display and Render SubPatch Levels to 50. Finally, go to the Rendering tab and deselect the Cast Shadow option. Do a test render of your scene to see the results of all your mad number-typing.

Figure 4: Test render at default Sasquatch settings

The lack of sky is a bit of a drag. Open the Scene tab in the Effects panel and turn on Gradient Backdrop. Change your Sky and Ground Colors to R: 149 G: 196 B: 237 and your Nadir Color to R: 190 G: 224 B: 255. That should do it. Do a test render; you should now have a rather ho-hum patch of earth against a clear blue sky, something like **Figure 3**. Save your scene.

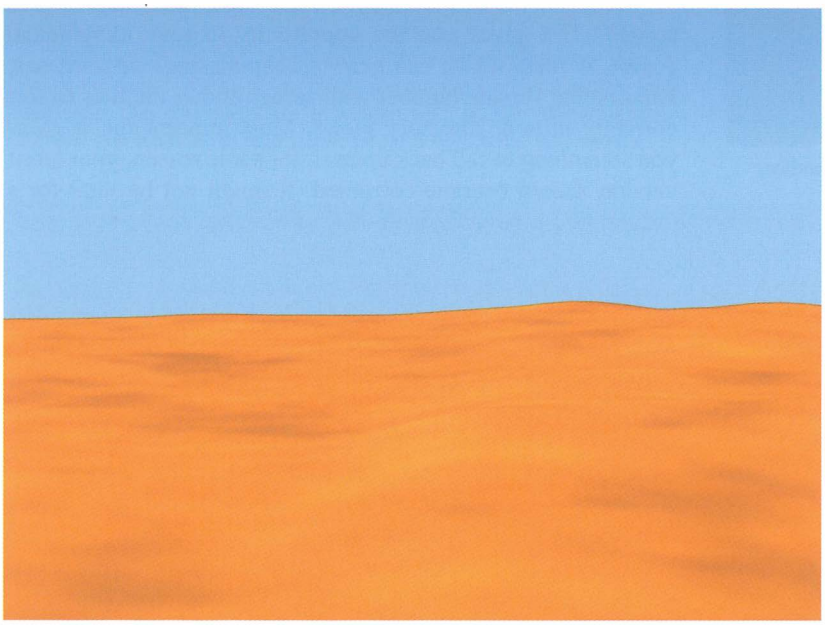


Figure 3: Grassy Plain, No Texture

## Planting the Seeds

Now, the moment you've been waiting for: it's time for some vegetation, Sasquatch-style. Sasquatch is divided into four main parts: two deformation plug-ins, a surface shader for shadows, and a pixel filter. For this tutorial, we're only going to need the standard Sasquatch deformation plug-in, the surface shader, and the pixel filter. Go back to the Item Properties window for the Grassy_Field object. Under the Deformations tab, open the Add Displacement menu and select Sasquatch from the list. Under the Processing tab in the Effects panel, select Sasquatch again under the Add Pixel Filter menu. Let's go to frame 10 and do a test render at the defaults, just so we can get a good laugh at how much the base fur settings (**Figure 4**) deviate from the final product.

Actually, even the base settings of Sasquatch are impressively realistic, despite the scruffy overtones. Let's open the Grassy_Field object's Item Properties again and double-click on the Sasquatch! plug-in entry under the Deformations tab. This will launch the Sasquatch interface.

For those of you who have used Sasquatch in its 1.0 incarnation, you'll immediately notice that the folks at Worley Laboratories have been hard at work again making things smoother and easier for the user. The huge, cluttered, intimidating panel of 1.0 (**Figure 5**) has been streamlined into a smaller interface (**Figure 6**) with related groups of tools accessible through a row of buttons along the top of the interface.

Figure 5: Original Sasquatch 1.0 interface.

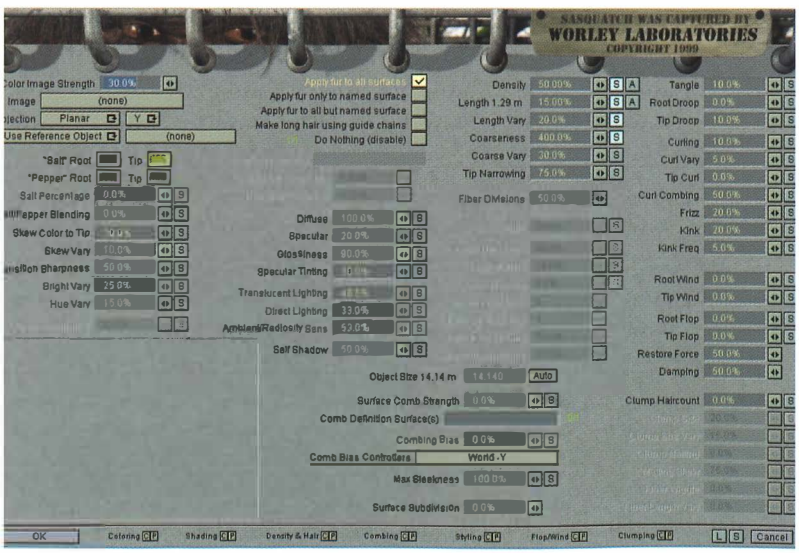
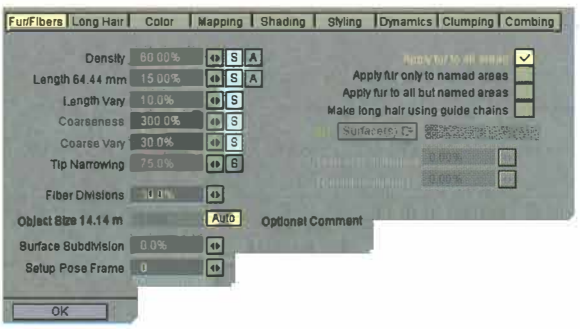



Figure 6: New Sasquatch interface.



I find that it's easier to visualize the appearance of grass when I'm looking at something grass-colored, so let's start out by clicking on the Color button. You should now see two pairs of color boxes, labeled Salt Root and Tip, and Pepper Root and Tip. The "root" and "tip" labels might seem pretty self-explanatory; they represent the colors of each fiber from bottom to top. However, the "salt" and "pepper" nomenclature is a little bit vague; what's the idea?

The secret to creating realistic fibers (we're going to refer to Sasquatch's fur as "fibers" from now on, just to keep things straight) is the same as for anything else in 3D: variety, variety, and more variety. The salt and pepper settings allow for just that; fiber colors are mixed based on a percentage value that can be controlled by a variety of means that we'll cover in just a minute. Let's go ahead and pick our colors. Set the Salt Root to R: 66 G: 57 B: 23 and the Salt Tip to R: 153 G: 159 B: 72. Next, set the Pepper Root to R: 79 G: 65 B: 11 and the Pepper Tip to R: 101 G: 109 B: 69.

Change the Skew Color to Tip value to 30% and leave Skew Vary at 10%. The first value represents at what point along the fiber its color will transition from the Root to the Tip value; the second value is yet another randomization variable. We're using 30% as our base value, because grass tends to be darker at the base and lighter along the greater length of the stem. We'll leave the Transition Sharpness value at the default of 50%; this represents how quickly the color changes at the transition point.

Finally, bump up the Bright Vary to 25% and the Hue Vary to 15%. This will randomize the appearance of our grass even further. The brightness value might seem a little extreme, but we're trying to represent many different varieties of grass within our little field. Next, click on the Shading button. Change the Diffuse value to 100%, Specular to 20%, Glossiness to 90%, and Specular Tinting to 30%.

Now it's time for three more interesting values. The Translucent Lighting setting contols how much light passes through the blade of grass onto objects behind it; we'll change this setting to 50%. The Direct Lighting value affects how much sensitivity our grass has to the direction of the light. Often, the light angle can cause it to respond in an unexpected way, depending on how the light bounces off the grass stem. We'll set this to 33%. Finally, we'll set the Self Shadowing value to 50%; by lowering it, we help to create a sense of light bouncing around amongst the stems. Do another test render. Great; now you've got green shag carpet. However, we're already on our way towards a better, brighter, grassier world. We're going to return to this section later, but first we'll make some changes to the physical appearance of the grass.

The second area of interest for us is the Fur/Fibers section. It is here that we set the density, length and coarseness of our grass. Sasquatch's approach to these values might seem somewhat odd at first, but makes sense once you start getting into the plug-in (the manual gives a full explanation as to why they did it this way). Each value is based on the actual physical size of the model; this enables you to easily scale a model and re-apply your fur settings without changing any numbers. A lot of the initial setup with Sasquatch is a matter of trial-and-error (and reading the manual). It takes practice and experimentation to get the hang of it. If you really want to get a feel for what's going on, I recommend doing a test render after you change each individual setting. I hope the labeling on each value is fairly intuitive; I'll explain each one a little as we go along.

Let's lower the density and the height of our grass first. The appearance that we're going for is of low, uneven grass that grows in dense patches, with sections of bare earth in between. You'll notice that next to the Length label, a value of 866.29 mm is shown based on the default 55% value; a little under 3 feet. Lower this value to 30%, which should change the length to 257.54 mm (about 10 inches). Now set Length Vary to 10% and the Coarseness to 300%. The Length Vary does exactly what the name implies: it varies the length of each blade of grass by a random value, in this case, between -10% and 10%. The Coarseness value determines the thickness of each blade of grass. This is actually affected by the height of the blade of grass itself; the shorter the grass, the thinner it will appear, and vice-versa. If you have to lower or raise the height value drastically, you'll find you'll need to change this value to compensate. You will also find that a lot of Sasquatch variables are interconnected in this way. Finally, bump up the Coarse Vary to 30% and change Tip Narrowing to 85%.

Click OK to accept these values, then do a test render. Now we've gone from green shag carpet to something a little more manageable. However, it's a little too regular for a field of wild grass. It's time to delve into one of the most useful areas of the Sasquatch interface: the S Panel. To access it, go back into Sasquatch and click on the S button located to the right of the Density value. A new window with the impressive title, Density Surface Variation Definition, should appear.

You can see that this panel is also broken down into sections: Mapping, Noise, Spots, Effectors and Slope. Sasquatch enables you to control almost every fur shader variable with an assortment of procedural and image-based values, much like LightWave's own object-surfacing system. For now, we're going to focus on the Noise section, where the first thing we see is a checkbox marked with a very familiar phrase: Use Fractal Noise.

Again, all of the values are relative percentages based on the size of the object. We want the density of our grass to vary fairly frequently over a 100-square-meter area, so let's set the Scale values to 10%. Now we're presented with three new variables: Small Detail, Bias and Sharpness. The first one determines how much detail is present in the fractal noise; we'll raise this to 50%. Secondly, the Bias determines the ratio of white-to-black in the fractal noise pattern; the higher the

percentage, the more the white areas expand, and vice-versa. We'll leave this at the default. Finally, the Sharpness value establishes the sharpness of the transition between black and white (like the Contrast setting in a lot of LightWave's procedural shader settings). Bump that value up slightly to 60%.

The last thing we need to do here is change the Base (Black) and Applied (White) values. The base value is represented by the black areas in the fractal noise and represents the minimum length of our grass. The applied value, represented by the white areas, is the maximum length of our grass. In our case, we're going to set the Base (Black) Value to 60% and the Applied (White) Value to 10%. Hold on a second! How can the base value be larger than the applied value? It just depends on the occasion, really. The Base and Applied labels are rather arbitrary; think of this as if we'd inverted the colors of our fractal noise texture. Go ahead and check your settings against those in **Figure 7**.

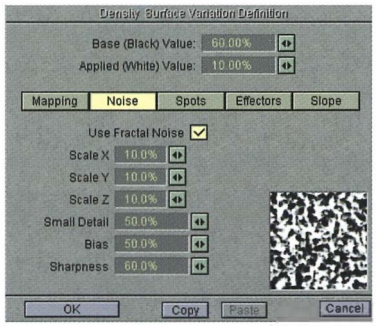



**Figure 7: The Density Surface Variation Definition, or 'S' Panel.**

We're ready to move on, but first, let's copy these texture settings into memory for use elsewhere. Click on the Copy button at the bottom of the interface, then click OK. Next, click on the S button next to Length, go to the Noise section, and enable fractal noise. Now hit the Paste button to paste the fractal settings we just created in the Density panel. Change the texture scale to 30%, the base value to 15% and the applied value to 30%. Click OK.

Do the same routine for the following settings and adjust the listed values:

| | Base (Black) | Applied (White) | Scale X,Y, Z | Bias | Sharpness |
|---|---|---|---|---|---|
| Length Vary | 10% | 20% | 20% | - | - |
| Coarseness | 300% | 200% | 30% | 20% | - |
| Coarse Vary | 30% | 60% | 5% | - | 50% |

By changing up the scale in each setting's S panel, we introduce a necessary level of randomness to our grass, preventing it from becoming too repetitive (the animator's worst surfacing enemy). One final thing we need to do for our grass: raise the Fiber Divisions setting. Sasquatch draws fibers as a series of straight lines. If the division level is set too low, the individual lines can be seen, which spoils the illusion. We'll set our value to 30%, giving us the necessary resolution without bogging down render time unnecessarily.

We're going to edit some S panel settings one more time, in the Color panel. Here's the breakdown again:

| | Base (Black) | Applied (White) | Scale X,Y, Z | Bias | Sharpness |
|---|---|---|---|---|---|
| Salt Percentage | 30% | 70% | 20% | - | - |
| Salt/Pepper Blending | 20% | 50% | 20% | - | - |

Save your scene, then do a test render with these values. Hmm...something's not quite right, is it? For some strange reason, our grass has become very sparse and spotty. What could it be? Not enough water? Not enough fertilizer? Good lawn management can be so difficult sometimes.

If you look closely (rendering from frame 0 will do the trick), you'll notice something very odd about our grass: it seems to be sticking together. As a matter of fact, that's exactly what's happening. Among its various other hair-shaping controls is the ability to enable hair-clumping, which is a naturally occurring phenomenon in real fur and hair. This is due to its porous nature, combined with the natural build-up of oils between individual hairs. However, grass isn't exactly porous or oily in the same manner, so it doesn't show these characteristics. The best solution: turn off clumping completely.

Go back into Sasquatch and go to the Clumping panel. Change the Clump Haircount value to 0%. You'll notice that all other values within this panel are now grayed out. Click OK and do another test render. Now we're getting somewhere! (**Figure 8**)

Let's do some final styling on our grass. It needs to be more irregular still, with stems growing around and between each other. Also, our grass is a little too rigid; we'll add some flexibility to it so that it can droop under the weight of the earth's gravity.

In Sasquatch's Styling panel, change the Tangle value to 10% and set Root Droop to 0%. We want just a little bit of Curling, too; say, 10%. Set the Tip Curling value to 0%; this will keep the curling distributed over the length of the stem, rather than just at the tip (which would look rather strange).

**Figure 8: Now that's more like it.**

We'll also set a Curl Combing value of 50%, which adds a bit of randomness to the direction and extent of the curling. Finally, in order to simulate bent and broken stems, let's add a 20% Frizz value and a 20% Kink value. Lower the Kink Frequency to 5% so that only a few stalks are affected here and there throughout the scene.

Render again. You should now be getting something that unmistakably resembles grass. There are some bare patches of earth showing up in between our grass, but that's okay; in the hard clay soil of central Oklahoma, that's pretty standard fare. And it looks more interesting, anyway. However, it's not mounding up realistically. Grass tends to grow on top of itself, fresh stems growing out of the remains of last year's growth. It begins to form something like small rounded hills, interconnected by runners created when the grass plants spread out.

Go back into the Length Vary S panel again and click on the Spots button. Turn on the Use Spots checkbox and change the following values: set the Spot Spacing to 20% and the Spot Size to 60%. Click on the Reverse checkbox (and no, you do not want a giraffe). In looking at the image shown, picture the white areas as grass and the black areas as bare earth. You should see a pattern emerge that fits the description above. Finally, set the Base (Black Value to 15% and the White (Applied) Value to 30%. Click the C button located in the lower right corner to copy these settings into memory, and click OK. Go to the Density S panel, click on Spots, and click the P button to paste our values from the Length Vary panel. Make sure to set your Black and White values back to 60% and 10%; the copy-and-paste function has the unfortunate drawback of overwriting these.

**Figure 9: Final render with shadows.**

Why are we using spots? Sasquatch combines procedurals and image maps into one texture that is applied at render time. The two textures only appear where they both contain non-black values. This gives us a compound texture that is more subtle and refined than the component parts.

If you render out the image now, you should see softly rounded grass clumps, interspersed with more barren patches lightly sprinkled with new growth. There's just one little thing missing: shadows! Our render looks good, but without that little detail that seems to crop up so often in reality (wherever light is found), it's just not complete.

Sasquatch has an interesting two-part process for dealing with shadows. First, go into the Surface Editor and click on our Earth surface, then click on the Shaders tab. From the Add Shader menu, select SasquatchShadow. You should now see a new, rather bizarre entry name: The Shadow of Sasquatch.

Go to the Image Processing tab in the Effects panel again and open the Sasquatch pixel filter. Open the Shadowing panel and check the following boxes: Receive LightWave Shadows, Self Shadowing, and Enable Cast Shadows. Make sure your shadow map resolution is set to 1000 and that Cast Shadows From LW Shadow Spots is selected. Click OK and do one final render (**Figures 9, 10**).

**Conclusion**

This is just a taste of what Sasquatch can do for you, whether it be grass, fur, or hair. In a future issue, we'll expand on this introduction to vegetation with Sasquatch to create a more complex scene, complete with trees, leaves, wind effects, and of course, grass stretching as far as the eye can see. We've only scratched the surface of what Sasquatch can do here; the capabilities of this plug-in are vast, and well worth the time and effort to learn.

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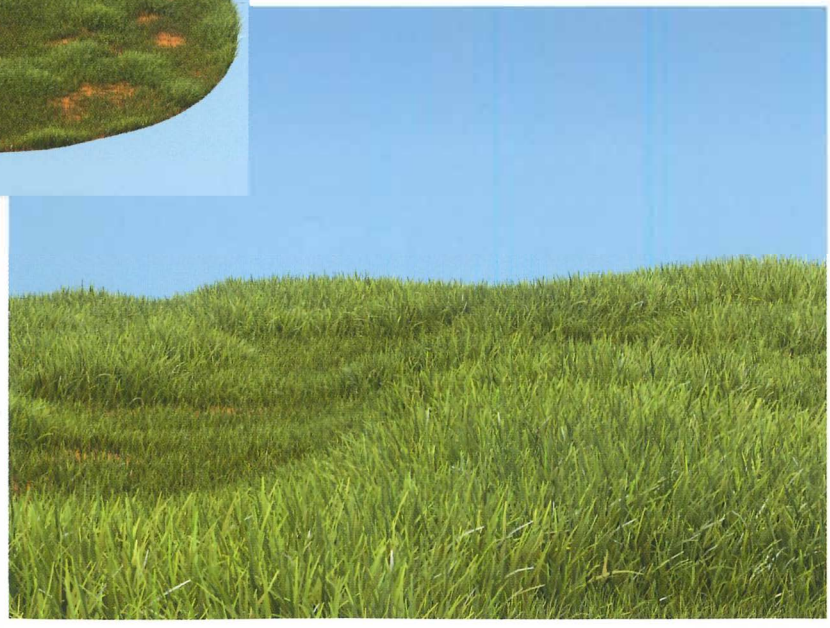
**Figure 10: Closer shot of final render with shadows.**



# Special Buffers: Production Life Savers

## by Doug Kelly

As more directors, producers and clients become accustomed to seeing visual effects in even low-budget productions, they also become accustomed to demanding effects for their own projects. This doesn't necessarily mean they will bring any special expertise (or even a basic understanding) to the VFX process. Instead, you can expect to see a growing trend of beings like Dilbert's pointy-haired boss intruding into your studio, displaying a truly appalling depth of ignorance about VFX while they insist on mucking with your work.

Get used to it.

In fact, you need to anticipate it, plan for it, and be able to handle it with a smile. These are the money people; they either have the money that you need, or they have some way of controlling the purse strings. However they did it, they have the power, and you have to live with that fact.

One of the most difficult moments in your VFX career may be when you have managed to complete a demanding project within your budget and before the deadline, and you show it to the client/producer/director for what you believe will be final approval. After all, you met all the specs, it looks good to you, and it's technically flawless. Why shouldn't the final approval be a rubber-stamp "OK"? *Because the person(s) who are supposed to approve the product need to justify their role in the project by making changes.* So the pointy-haired one insists that the light is too bright, or the color isn't right, or it just "looks wrong," and you don't get a paycheck until you change it to suit their whim.

Depending on how you structured the project, and on what the demanded changes are, your response could range from a solicitous smile and a nearly-instant "Like this?" to the commission of felonious assault and some time in a mental ward. Let's take a look at how you can increase your chances of getting paid and staying out of trouble.

3D special effects can make you especially vulnerable to last-minute changes simply because your work must be rendered. Rendering a 3D element with any given resolution and image quality is simply more computation-intensive than the same resolution and image quality in a 2D medium. If you have to modify your work after you've rendered, your previous rendering is pretty much wasted. You simply have to make the changes, then repeat the entire rendering process. The higher the production values and the longer the piece, the longer this rendering will take, and the less chance you have of staying within budget and on schedule.

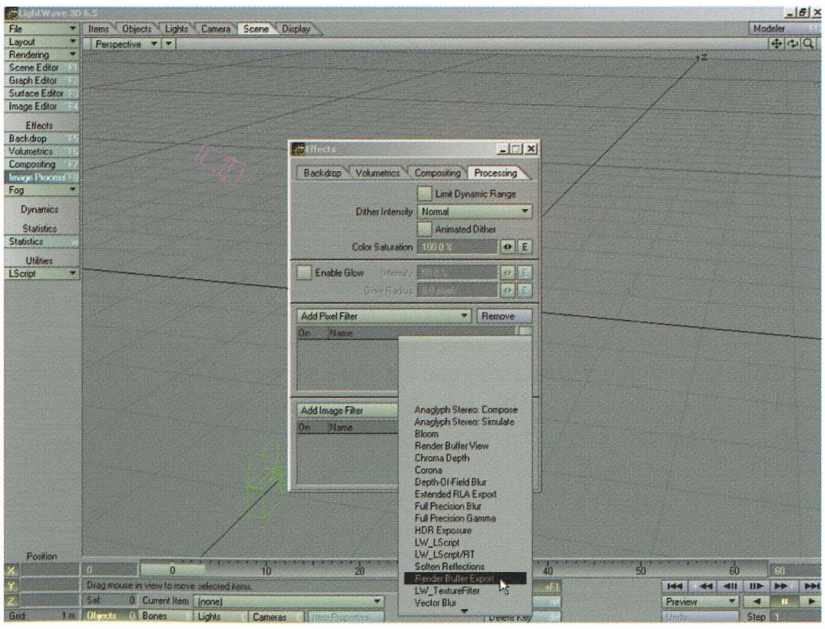
One set of protections against this vulnerability is to remove as much of the VFX process as possible from the 3D realm. Because 2D processes are so much faster, keeping the lion's share of the work in 2D means you can accommodate changes faster. If you've structured your 3D process to take advantage of this, you should be able to make most last-minute changes exclusively in the 2D portions of the process.

### Special Buffers Overview

LightWave has a powerful set of features to facilitate 2D postproduction processes such as compositing. One of these features is called Special Buffers, which can save out separate image files of each subset of the LightWave rendering data. All the Special Buffers are already calculated as part of the normal LightWave rendering process. The only addition that the Special Buffers feature makes to rendering time is the time it takes to write the extra image files.

The Special Buffers Export is an image filter plug-in. This plug-in is accessible through LightWave's Scene|Effects|Image Process tabs, or by pressing Ctrl+F8. Near the bottom of the Processing tab, you'll find the Add Image Filter drop-down button. Clicking on this button will show a list of available image filter plug-ins, **Figure 1**.

**Figure 1: Render Buffer Export plug-in selected from list of image filters.**



Once you have added the plug-in, the label Buffer Export appears in the image filter list. Double-click on it, and the Render Buffer Export dialog appears. Click on the Source drop-down button, and you'll see a list of the available buffers, **Figure 2**.

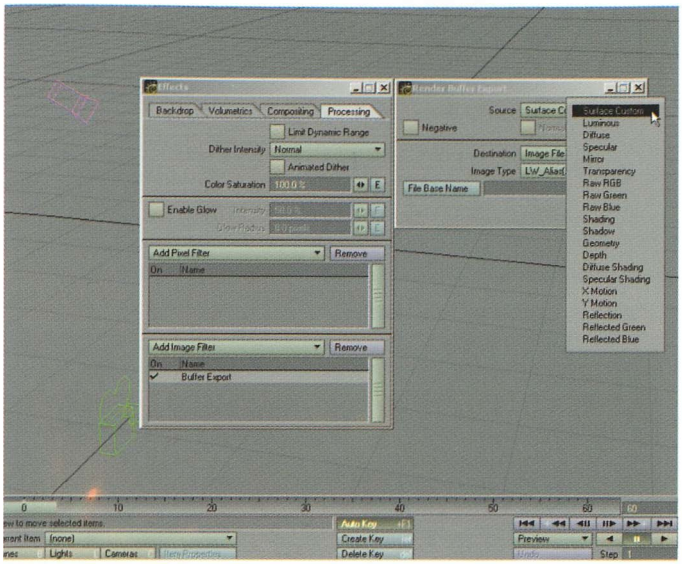



**Figure 2: Render Buffer Export dialog with Source buffer list opened.**

The default setting for the Destination option is Image File, which will create a separate image file for the selected buffer. The other options are Rendered RGB, which would replace the standard rendered color channels, or Rendered Alpha, which would replace the standard rendered alpha channel. Either one can occasionally be useful, but generally you're safer with the default setting.

The Image Type setting is just like the Render Option of the same name. For maximum compatibility with compositing and image processing software, I personally prefer to use the LW_TGA32 file format. You may prefer some other format; I strongly encourage you to test any image format with all your tools before you commit to using it for a large or complex project.

The standard Render Buffers available for export include: Surface Custom, Luminous, Diffuse, Specular, Mirror, Transparency, Raw RGB, Raw Green, Raw Blue, Shading, Shadow, Geometry, Depth, Diffuse Shading, Specular Shading, X Motion, Y Motion, Reflection, Reflected Green, and Reflected Blue.

The Surface Custom buffer is a grayscale image showing assigned values for each object surface. This is handy for masking special effects to particular surfaces. The default value for all surfaces is 0; if you want to change any surface's custom value, go to the Advanced tab of the Surface Editor.

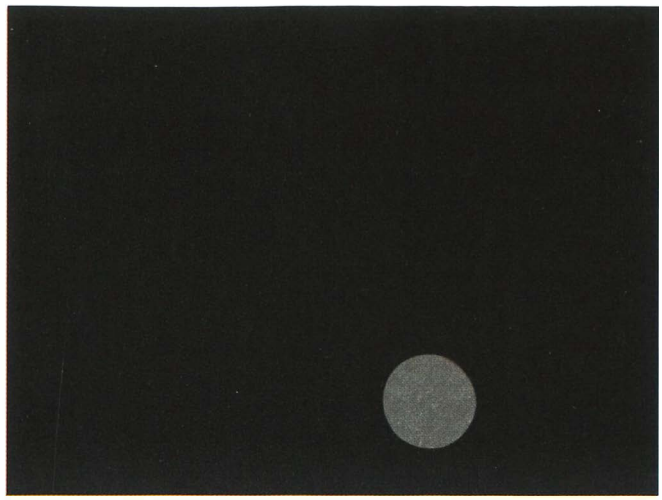


**Figure 3: The Luminous buffer shows any luminous surfaces. This is useful for controlling glows and similar effects.**

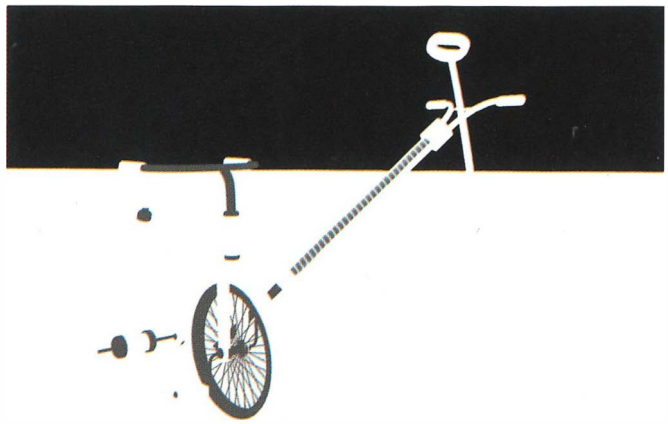


**Figure 4: The Diffuse buffer shows the base diffuse values for object surfaces.**

**Figure 5: The Specular buffer shows the base specular values for object surfaces.**

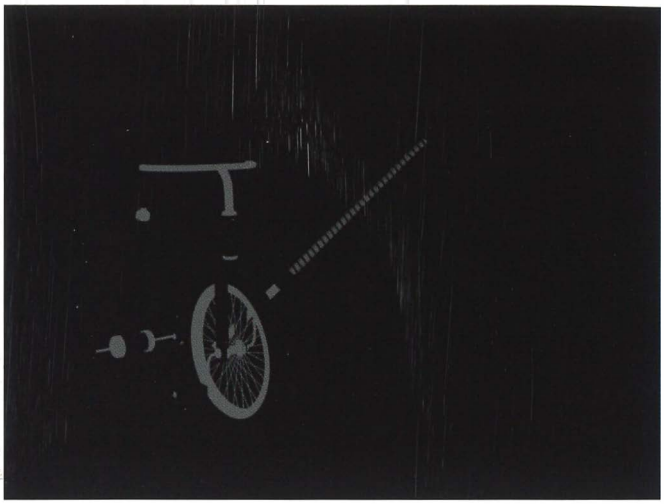


Figure 6: The Mirror buffer.

Figure 7: The Transparency buffer shows transparent materials in lighter shades. In this buffer from the Toys scene, the shaft housing of the pogo stick is made of a transparent material.

Figure 8: The Raw RGB buffer shows the color values of surfaces without lighting, shading or shadows.

Figure 9: The Raw Green buffer.

Figure 10: The Raw Blue buffer.

Figure 11: The Shading buffer shows grayscale shading values including shadows and specularity, but without color.

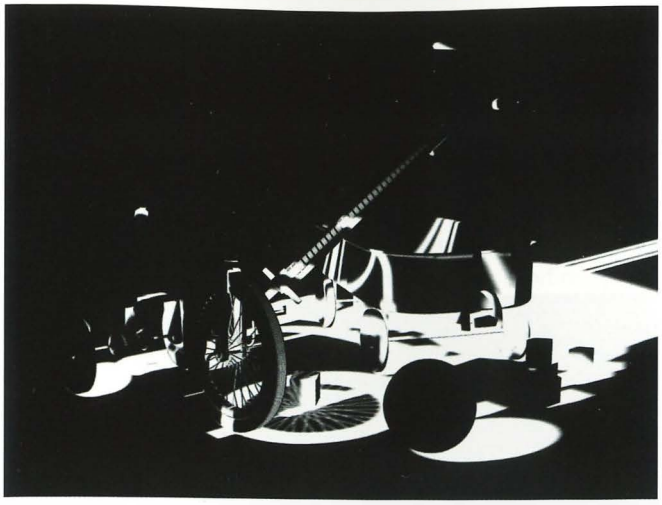


Figure 12: The Shadow buffer is essentially an alpha channel for the shadows.

Figure 13: The Geometry buffer shows surfaces tangent to the camera's axis as brighter, and parallel to the camera's axis as black.

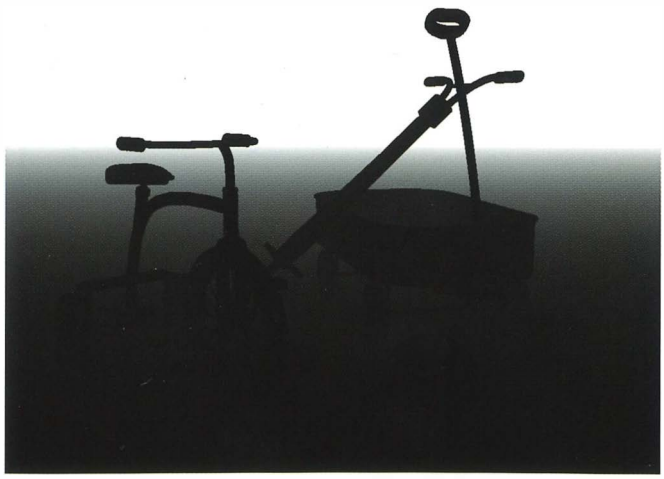


Figure 14: The Depth buffer is a grayscale image showing distance from the camera. Depending on your compositing software, you may want to invert the default values so nearer surfaces are brighter. You can also fake this, and get an antialiased buffer, by setting all objects to black and using a fog effect to provide depth shading.

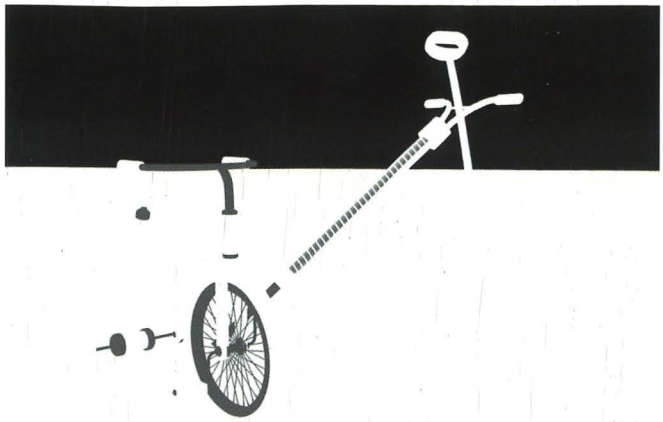


Figure 15: The Diffuse Shading buffer. This and the Specular Shading buffer are two of the more useful Special Buffers.

Figure 16: The Specular Shading buffer is especially useful as a matte or alpha channel to control modifications to highlights.

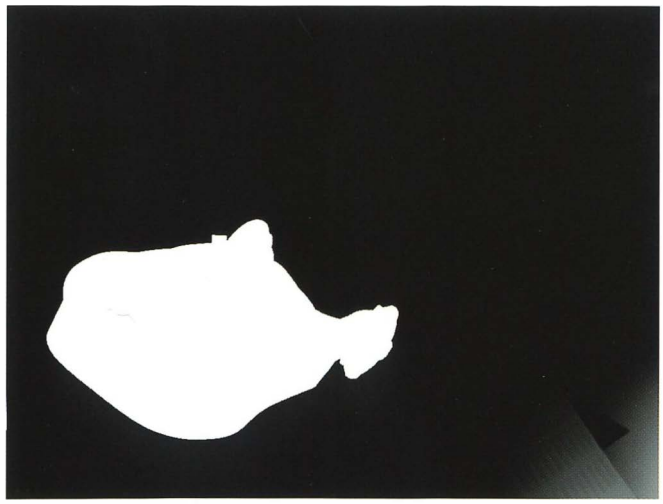


Figure 17: This is the X Motion buffer for frame 38 from the Blade.lws scene file. This buffer shows brighter whatever parts of the scene are moving along the X-axis. This data is especially useful for motion-based processes such as motion blur or retiming. It can be much more efficient to motion-blur in a 2D compositing program than to render motion blur in LightWave. The Y Motion buffer also shows motion, but along the Y-axis, and is also useful for motion blurring and similar operations.

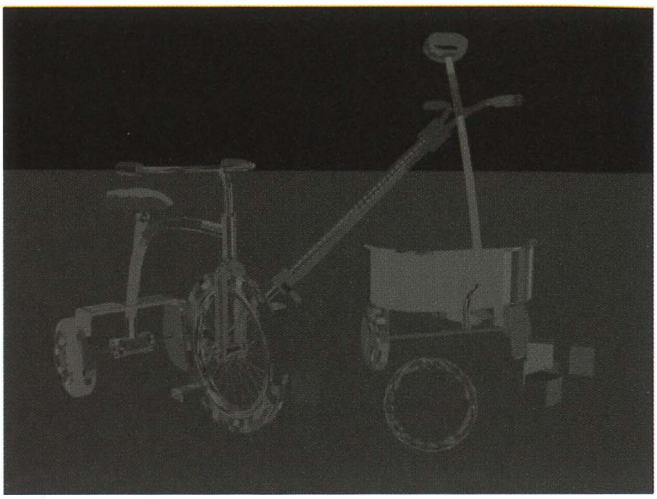


Figure 18: The Reflection buffer.

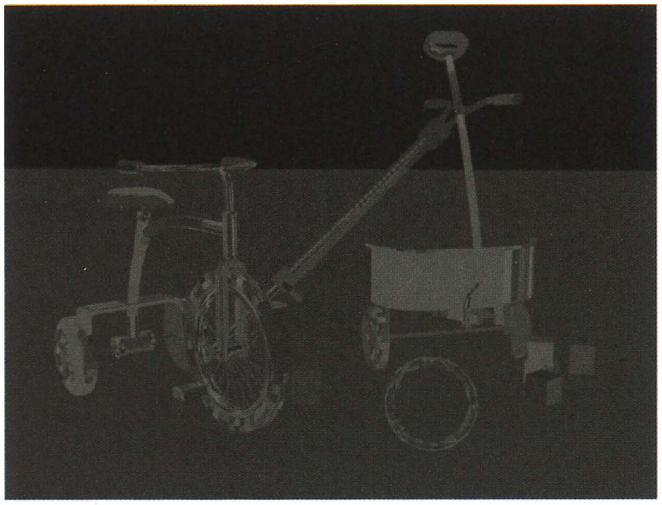


Figure 19: The Reflected Green buffer.

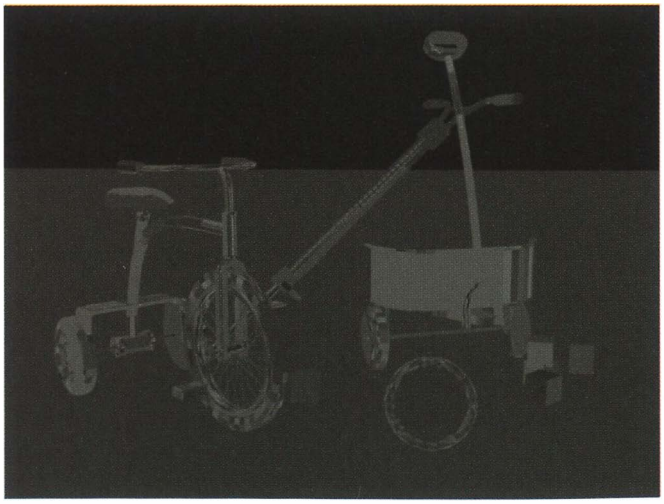


Figure 20: The Reflected Blue buffer.

As you gain experience, you'll develop your own preferences for which buffers to use. Some of the Special Buffers are nearly always useful, others are useful less often, and some are rarely useful. However, the usefulness of each buffer depends on both your working style and the needs of the project at hand; no one set of buffers is right for every job, every artist, every time.

Figure 21: The complete standard LightWave rendering of the Toys scene.

Two other image sequences you'll typically want to render are the complete standard LightWave render, **Figure 21**, and a no-shadows rendering pass, **Figure 22**. This second pass is usually simply a matter of turning off the shadow maps and any shadow raytracing. This is an example of a general rule for rendering multiple layers or passes: *If you want to control something, render another pass with that something left out.* The difference between the standard and the no-shadows passes enables you to modify the shadows with your compositing software.

Figure 22: Second rendering pass with all shadow maps disabled.

### Setting Up for Special Buffers

Working with Special Buffers requires you to keep track of up to twenty times the usual number of rendered image files. The surest way of keeping all this extra data straight is to create a standard set of directories in which to store the buffers' output. My personal preference is to set up a master directory on a drive with plenty of space, then nest a subdirectory for each Special Buffer inside the master directory. Assign each Special Buffer a path to its own subdirectory, and a filename root that is an abbreviation of the Special Buffer's name. For example, the Depth Special Buffer might have the path and filename I:\Buffers\Depth\depth0000.tga. One advantage of this is that I can clear previous renders by running a Find command on the master directory and all subdirectories for any file ending in *.tga, then delete the results. Presto, all the subdirectories are empty for my next project.

No two ways about it, setting up a scene to save out all twenty Special Buffers is tedious. However, if you do it right, you only have to do it once. The settings for Special Buffers are saved in the scene file, which makes it very easy to save, edit, copy and paste your buffer settings. If you do this right, you'll only have to set up and save one set of Special Buffers. Once you have a set that works, you can copy-and-paste it into any scene file.

The scene file data for one Special Buffer looks like this:

```
Plugin ImageFilterHandler 1 LW_SpecialBuffers
0
0
"I:\\Buffers\\Surface_Custom\\srfc"
4
"LW_TGA32(.tga)"
1

EndPlugin
```

This data comes after the AnimatedDither setting and before the RenderMode setting in the scene file. If you're uncertain about editing scene files, you might want to manually set one Special Buffer, then simply select and replace it with your complete buffers data.

Once you get the hang of editing the Special Buffers section of your scene file, you can easily create subsets of just those buffers you really need. It's much faster (and a lot less tedious) to delete a Special Buffer this way than it is to add buffer settings from scratch.

Once you have your Special Buffer directories set up, render frame 0 from a scene that has all the Special Buffers enabled. This should place a single image in each buffer's folder. Your compositing software will usually need an image in each folder before you can set up the necessary paths.

For the rest of this tutorial, I'm using eyeon software's Digital Fusion compositing software. You can do this kind of work in most compositing programs, but DF is especially capable and very stable with my other software and hardware. There is a fully functional demo version of Digital Fusion available for download from eyeon software's website, **www.eyeonline.com**. I highly recommend trying it out, if you don't already own a copy.

Launch Digital Fusion. Create a new flow. Add a Loader. Rename the Loader "Complete". It's a really good idea to rename each tool as you create it, so be sure you name each loader appropriately. In the loader's controls, load the image file for frame 0 from the Complete folder. This is the image sequence shown in **Figure 21**, the default complete output of LightWave's renderer.

Add a Loader. Rename the Loader "Surface Custom", the name of the first Special Buffer. In the loader's controls, load the image file srfc0000.tga from the Buffers\Surface_Custom folder.

Add another Loader, rename it for the next buffer, and load the frame 0 image from that buffer's folder. Repeat until you have a loader for each buffer. You should end up with something like **Figure 23**.

**Figure 23: Digital Fusion flow with loaders configured for all 20 Special Buffers plus the default RGB image.**

Save the flow as All_Buffers.flw, or something similar; I suggest you also save the flow in the root Buffers directory, just to keep things organized.

Now that you have LightWave configured to render out all the Special Buffers, and you have a Digital Fusion flow that automatically loads all the buffers, you can quickly set up nearly any composite you can imagine using those buffers. Simply make a copy of the default all-buffers flow, delete the loaders you don't need, and connect whatever other tools you require.

**What Can I Do With This?**

Let's take a look at an example of how you can use LightWave's Special Buffers with Digital Fusion to give you lots of fast, easy control over the appearance of your final images. This example will only need three image sequences: the complete standard render, the shadow buffer, and a second pass with all shadows turned off.

In Digital Fusion, make a copy of the All_Buffers.flw flow, name it Shadows.flw, and delete all the loaders except for the Complete, Shadow, and No Shadow image sequences.

We want to control the color and intensity of the shadows, and the color of the ambient light. The simplest part is controlling the ambient light color. To do this, we connect a Color Gain tool after the No Shadows loader, and name it Light Color Gain. Modifying the gain values in the Color Gain tool will have an effect similar to putting colored gels over a white light. The output of the Color Gain tool goes into the background input of a Merge tool, named Merge Shadow, as shown in **Figure 24**. The output of the shadow controls (which we'll set up next) will go into the foreground input of this Merge tool.

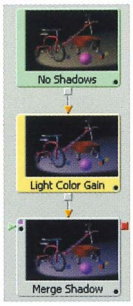



**Figure 24: No Shadows loader, Color Gain tool, and Merge tool configured to control ambient light color.**

To control the shadows, we need to use the Shadow buffer as a matte or alpha channel. Add two Channel Booleans tools to the flow, and connect the output of the Shadow loader to the background inputs of both Channel Booleans tools. Connect the output of the Complete loader to the foreground input of one Channel Booleans tool, and name that tool Shadow Alpha. Add a Background tool and connect it to the foreground input of the remaining Channel Booleans tool, and name it Color Boolean. Set both Channel Booleans tools to Copy the RGB channels from the FG input, and Copy the Alpha channel from the BG input, as shown in **Figure 25**. This adds the Shadow buffer as an alpha channel to both the Background tool's output and to the Complete image sequence.

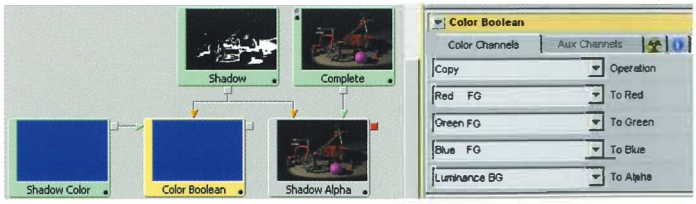



**Figure 25: Shadow loader, Complete loader, Background tool and two Channel Booleans tools.**

Add a Merge tool, name it Merge Color, and connect the outputs of the two Channel Booleans tools to the Merge tool's inputs. The Color Boolean should connect to the foreground input, and the Shadow Alpha should connect to the background input, as shown in **Figure 26**. The Merge tool uses the alpha channel (a copy of the Shadow buffer) from the Color Boolean tool to mask the overlay the Background color over the Complete image sequence. Essentially, the Background color is limited to only the shadowed areas.

Finally, the output of Merge Color should connect to the foreground input of the Merge Shadow tool. The Merge Shadow tool also uses the Shadow buffer to limit the overlay of the Complete image sequence (with shadows) over the No Shadow image sequence (without shadows). By varying the Merge Shadow tool's settings, you can control the density of the shadows.

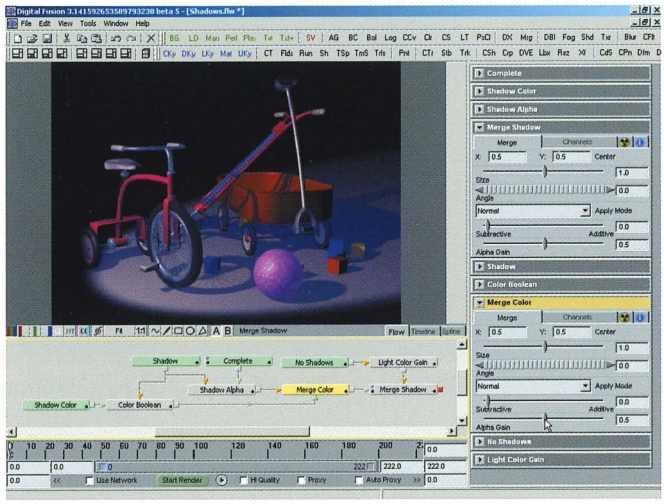


**Figure 26: Flow set up to interactively control shadow density and color and ambient light color.**

Once the flow is finished, you can modify the color and density of shadows, and the color of the ambient light, with only four controls. The color of the shadows is controlled by the color picker in Shadow Color, in this case a dark blue. The intensity of the shadows is controlled by the Merge Shadow alpha gain, set in **Figure 26** to 0.5, or 50%. Set this to 1.0, and the shadows are as dark as in the default render; set it to 0.0, and the shadows disappear entirely. The balance between the original black shadow color and the blue Shadow Color is controlled by the Merge Color alpha gain, also set to 0.5. Set this to 0.0 and the shadows are completely black; set it to 1.0, and the shadows will be whatever color appears in the Shadow Color tool. The ambient light color is controlled by the Light Color Gain settings, in this case 1.7 on the blue channel only. Compare the results in **Figure 26** with the original Complete rendered image in **Figure 21**.

You could certainly get this same effect in LightWave alone, but you would have to make changes, render, make changes again, re-render, and so on ad nauseam. Making these adjustments in a compositing program with near-real-time results is much faster, and makes it much easier for you to deal with difficult or demanding clients.

*Doug Kelly is the Editor of Keyframe Magazine, the author of Digital Compositing In Depth, and teaches digital compositing at The DAVE School in Orlando, Florida. You can send email to him at* **dougk@keyframemag.com**.

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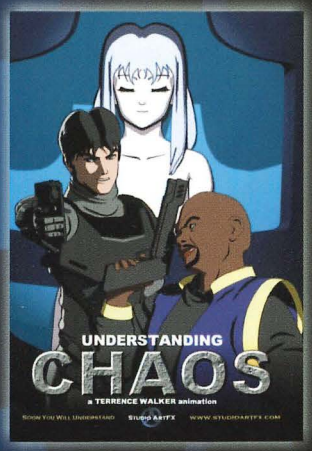


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# Monsters, Inc.

## Effects Review by Jared Bendis

Computer generated and cuddly! I never thought I would put those two together in a sentence. But what can I say? When I see that big, furry, blue-and-purple spotted James P. Sullivan (Sully to his friends) I just want to run up and hug him. Sully (voiced by John Goodman) is the top Kid Scarer at Monsters, Inc. where he works with his Scare Assistant and one-eyed roommate Mike Wazowski (voiced by Billy Crystal).

It is hard to take your eyes off the fur. You watch it as it moves, you watch it as the wind blows over it, you watch it as he interacts with other creatures, and you just want to reach out and touch it. You would think that as outstanding as the fur looks it would somehow stand out and not fit into the rest of the film, but it fits great. Mike Wazowski is short, green and rather smooth, and spends most of the film looking perfectly natural standing next to Sully's big furry exterior. Sully's fur is just one highlight of the continuum of effects and textures that exist in the monster world.

The Sully stuffed animal doesn't look as good as the real thing. A funny thing is that when dealing with CG, you normally can expect the toys to be perfect. If you want a Buzz Lightyear toy, you send the data file to the manufacturer and get an exact replica. The fur on Sully is so good that the only way to reproduce it would be to use real fur (nothing else moves quite the same). The Sully dolls are very cute though, and I'm sure they will be a big hit for Christmas.

Another highlight of the film is Randall Boggs, the chameleon monster voiced by Steve Buscemi. The effect when his color (and texture) changes and blends is fantastic and is a very good example of how essential timing is when using an effect. Even better is when he turns invisible altogether. As you try to follow an invisible monster tracking across the screen you suddenly realize just how good this film is. It's hard to imagine how you even approach directing invisible cast members, but directors Pete Docter, David Silverman, and Lee Unkrich do it with apparent ease.

It wouldn't be a Pixar film without little inside gags and attention to the smallest details. Keep an eye out for the ball from *Luxo Jr.* and Jessie from *Toy Story 2*. Following around Mike Wazowski's one eye is pretty fun; it's not left, it's not right, it just is. But watching *Monster, Inc.'s* CEO Henry J. Waternoose (voiced by James Coburn) focus on an item with his half-dozen-plus eyes at the same time is absolutely fascinating. Waternoose's eyes aren't all the same either, you get the impression that there are primary eyes and secondary eyes and that they all function differently. The eyes, much like the fur, are just part of the range of characteristics that the monsters are capable of.

A lit candle in one scene provides a powerful but subtle effect. The lit candle could have been a real risk for the team at Pixar. Instead, they show you that they can make something look real, but not too real, and that they completely understand all the nuances of the world and imagery that they are trying to create.

So what doesn't work? It wouldn't be a critique without some criticism. Well, if I have to nit-pick I will express my disappointment at the lack of bloopers during the credits. Now I know that the *Toy Story 2* bloopers were not released right away, so I can only hope that in a few weeks when I go see it again they will be there. Most of the people in the theatre I was in were waiting for the credits as they did for the last two Pixar releases.

The only other thing that bothered me is the Abominable Snowman. Compared to the fur on Sully, the Abominable Snowman (voiced by John Ratzenberger) looks like its 'fur' is cotton balls glued to an armature. Now it isn't that bad, but compared to Sully's fur it really stands out. This might have been a deliberate homage to the Abominable Snowman in the stop-motion *Rudolph the Red-Nosed Reindeer*, in which case the Pixar crew really nailed the look of the stop-mo puppet.

Get to the theatre early, you don't want to miss the teaser trailer for *Star Wars II*, but more importantly the film is introduced by the Pixar short *For The Birds*. *For The Birds*, much like *Geri's Game*, is a real gem from the crew at Pixar. In just 3 minutes they leave you speechless, visibly wowed, and they demonstrate just how good they are at making you laugh. They certainly know how to warm up a crowd.

The title sequence for the film is unusual for a contemporary CGI film because it's a conventional movie opening. The opening appears to be traditional hand drawn and replacement animation of credits and two-dimensional doors (that theme becomes very important later in the film). The opening is so mainstream that you almost expect to it to fade to live action footage when it's over.

Those doors from the opening are used in a pivotal chase sequence towards the climax of the film. This sequence is more than just a roller coaster ride and chase sequence; it is an homage to the classic rail chases in cinema history from Buster Keaton's *The General* to Spielberg's *Indiana Jones and the Temple of Doom*. Of course *Monsters, Inc.* goes one step further: the doors act as portals that interrupt, change, and augment the perfect timing that is demonstrated in every Pixar film.

So go see this film and enjoy it. Then see it again and watch the timing. Then go see it one more time, and this time laugh at the jokes that no one else has gotten yet!

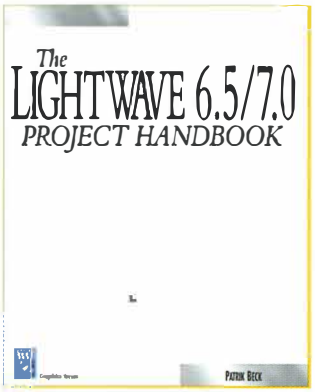
5 out of 5 key frames

*For The Birds* image copyright Pixar Animation Studios
*Monsters, Inc.* images copyright (c)2001 Disney/Pixar

# The LightWave 6.5/7.0 Project Handbook

## by Patrik Beck

**Reviewed by Doug Kelly**

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If you are new to 3D as either a student or a hobbyist, this book is a good introduction and overview. If you are an experienced LightWave user and you actually read the NewTek manuals, you will find a few useful ideas in this book but little completely new material.

The CD-ROM contents include 62 scenes, 104 objects and the associated textures, 27 finished animations (duplicated in QuickTime and MPEG-1 formats), and rendered images (such as PRISM.JPG, reproduced here). The finished animations and rendered images are not the exact results of the tutorial project from the book; the readme files state that they are combinations of techniques from several different projects. I'm not sure if they are supposed to function as inspirations, but if so, how about a hint list as to how to make them?

The CD also contains 272 figures from the book. Good thing, too; the book has no color images. This is a pretty sad 'replacement' for a color insert. Apparently, whenever you are working through a project requiring color discrimination, you are expected to have the CD-ROM in your machine and to open the necessary color image files, rather than relying on the black-and-white images printed in the book. In my opinion, this is a false economy for a $50 graphic arts book. Even a single eight-page folio of color images would have been adequate for the most crucial color illustrations, and it wouldn't have made the book's production unprofitable.

The inclusion of the demo 7.0 version of LightWave on the CD is very helpful to the student or beginner who wants to give the software a thorough test run before making the investment. This audience is also a reasonable justification for some of the more basic material in the book, which would otherwise be a duplication of the official LightWave 7.0 manual. If you, or someone you know, is interested in LightWave but not sure enough to make the purchase yet, this book is a good introduction and will answer many of the most frequently asked questions.

Finding your way around the book should present no problems for the intended audience. The table of contents and the index provide adequate, accurate road maps to find your way. I'm pleased to see a more thorough job of indexing in this book than has been the practice in some recent titles; the use of

*See* and *See Also* cross-references is especially helpful to beginners and students.

If you read this book carefully and work through each project, you should end up with the practical knowledge necessary for such basic animations as flying logos, onscreens, write-ons, and simple mechanical linkages. This is an adequate level of knowledge for the reader who wants to create title sequences for videos or advertising, or add the occasional effect or onscreen to a video, ad or multimedia production. There are plenty of working artists out there who are making a living doing just this level of work.

If you want to make a living (or just a little side money) with LightWave, you should know how to do everything in this book. If there is anything here that you don't know how to do, you need to get up to speed before you hang out your shingle. You might not use everything here on every job, but these projects form a solid basic foundation for you to build on. This book does not address more complex issues such as character animation or soft-body dynamics, but its coverage is consistent with its stated audience level of Beginner to Intermediate.

If you want to take a look at part of the book for yourself, you can download the table of contents and the first chapter, "Introducing LightWave Animation," in PDF format from the Charles River Media website. There is also a link to this file from the Amazon.com site.

*Note: Patrik Beck is a former editor of and contributor to Keyframe Magazine, but Keyframe and Mr. Beck have no common financial or other interests (positive or negative) at this time.*

## FINAL CUT (CONTINUED FROM PAGE 56)

in the business, and there's more than just symbolic optimism behind the opinion that the New Year will bring new opportunities. The bigger question is, how does one survive the vacuum in order to take advantage of those new opportunities?

Those of us trying to land projects for shops have our own set of challenges: competition from companies with more favorable labor rates or government subsidies, competition from aggressive upstart companies (The Eagles' "New Kid In Town" is coursing through my head right now), and the sheer overhead required to maintain a facility capable of large-scale animation make survival in times of little or no work a tricky task indeed. Companies need to look at new areas of the business without straying so far away from their core skills as to risk drowning in unfamiliar waters. They also need to be brutally realistic about cutting costs without jeopardizing their ability to function smoothly. I know, I know, enough about my worries, what about you?

First off, in the immortal words of Douglas Adams: Don't Panic. The biz is indeed cyclical, and if you've been through some of the smaller betwixt-jobs slowdowns then you should recognize this as being very similar, just bigger (in some cases, much bigger). That nest egg you were contributing to during your last five-month gig is going to come in really handy, assuming it's still available. If you've got it, maybe this would be a good opportunity to stretch yourself creatively: learn some new software to make yourself more marketable, hit those SIGGRAPH meetings, work on some really sweet shots for your reel.

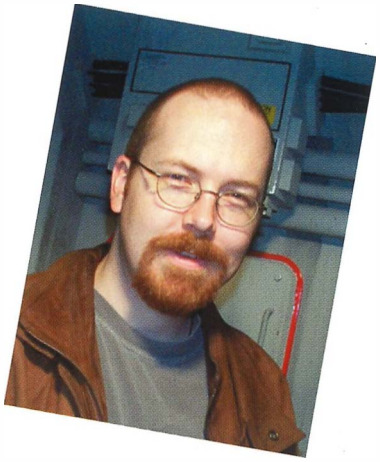
Get used to networking and marketing yourself, because when things pick up again there are going to be a lot of people itching to get back to work. If you've been working at one facility since you started in the business, this may be your chance (desired or not) to see what other shops are like. It used to be that animators were known for hopping from shop to shop (and, the joke went, doubling their salary with every move). These days I don't see the dollars hiking up with every shift, but I do see more of a nomadic existence for much of the workforce. With the big shops (Disney's Secret Lab, for example) closing down, I see fewer houses able to hold large numbers of artists on staff and more people drifting between shops or freelancing for multiple houses at once.

With an industry as ebb-and-flow as ours is, it's never a bad idea to have alternative skills outside the business up your sleeve. Some animators I've known can go off in a pinch and write code in the real world, and the only hard part for them is re-learning how to wear a shirt with buttons and a collar. One model-builder who used to be on staff here has not only become an ace in our freelance bullpen (and those of other shops), but also has started building some amazing guitars on commission, and it wouldn't surprise me if that will soon or has already surpassed CG as his main earner. Talent and diversity, good qualities to have.

Most importantly, hang in there. If you're faced with downtime and can afford to use it to improve yourself, then it's time well spent. If you have to go back to 'the world' for a spell in order to keep from selling your computer, then do so with the understanding that we'll get you back in as soon as we can.

Now, where did I put that copy of "Thus Spake Zarathustra"?

*Steve Pugh is General Manager of Foundation Imaging. You can send email to him through their website,* **www.foundation-i.com**.



by Steve Pugh

Sometimes, no matter where you are, you can hear them if you listen carefully. If you're working in visual effects or computer animation right about now, there's a good chance that you won't have to strain too hard to catch that chirping noise.

Why are things so slow right now? What can be done to perk them up? More importantly, how can we weather the storm (or lack thereof) and emerge unscathed on the other side of the vacuum?

Like practically everyone else in the country, our industry is feeling the pinch of an "economic slowdown". Things have gotten to the point where even Mr. Greenspan himself has finally uttered the "R" word. So there's strike one against us: the general state of the economy. Hollywood has always been considered a "recession-proof" industry, where dreams are made and movies are produced to help the rest of the country escape from worry for a couple hours at a time. These days, though, movie studios are less autonomous. Major players from corporate America own huge chunks of most of the players, and their bottom lines bleed over into the studios' bottom lines.

Studios themselves have been bitten by their own blockbuster mentality, and I believe that we are still feeling and will continue to feel the effects of such dollar-droppers as *Godzilla* and *Final Fantasy*. Nobody on the front lines is a stranger to the studio mentality, where movies are made or killed based on what we see as the most arbitrary and nonsensical criteria - "*Wow, Attack of the Snakemen* sure did well this weekend, with its fantastic script, glorious cinematography, tight acting, and wonderful direction....we should do something with snakemen!" That's all well and good, until the conclusion reached is that "movies with effects don't do well." Thanks, guys. Maybe the fact that your script sucked more air than Norm Abrams' dust collector had something to do with it?

This particular year has also seen two strikes hit the industry, without even happening! Fear of the Writers' Guild and SAG walking out this summer caused many studios to push extra hard during the springtime. The theory was that if the strikes did hit, they would have enough in their coffers to survive the impact; much like my crazy uncle Jimbo and his bomb shelter filled with canned artichoke hearts. Forward-thinking? Absolutely. Wise? Sure. Good idea in hindsight? Not really, because the strikes never happened. Instead, we got a third and fourth quarter where there isn't as much work because everything was done by summer. It's enough to make the grasshopper want to kick the crap out of the ants for all of their planning and preparation.

And, of course, everyone right now is scared of making any film that might feature an explosion or excessive violence. This is understandable in some cases, but it's clearly knee-jerk overcompensation in other cases. We'll just have to ride this one out, because sooner or later the public is going to want a good, rousing patriotic movie where all of the right asses get kicked. *Behind Enemy Lines* and *Blackhawk Down* are coming out this year, and should bode well for that genre. *Monsters, Inc.* was number one this weekend, hopefully undoing some of the damage done by *Final Fantasy's* box office anemia. I don't know about you, but I'm typing slower than usual because every finger I have (even the ones in the jar) is crossed in anticipation of *Lord of the Rings*. Good fantasy stories are the ultimate escape, and that one could signal a flurry of green lights come springtime. Maybe it's just the tenth-grader in me, but *Elfquest* would make a neat all-CG film, I think; if you hold the rights, call me!

Yes, things are slow right now. (I can call them "slow" because I'm fortunate enough to still be employed; otherwise, I would be using words that aren't quite suitable for publication.) They will, however, pick up again. Autumn is traditionally a quiet period

cont. page 55

## Aura 2

The Desktop Video Paint System

**Paint over video and bring life to your animations.**

**Terrence Walker,** creator of **'Understanding Chaos'**, has already discarded all his other 2D and painting tools in favor of Aura's unique flexibility, **"I can't mess with three different packages to get my work done...This one only paints, this other one can composite but you need a third for true 2D animation... Who needs that? With Aura, it's all right in front of me and I can do whatever I need to get the shot done!"**

Whether you are working on print graphics, web animations or video productions, Aura 2 from NewTek is the tool of choice. Aura's next-generation paint engine boasts impressive new features including **four-point pixel tracking, interactive keyframer, stroke recorder, natural media brushes** and **unlimited layers** with **real-time alpha channel**. Enhanced **scripting power** cut hours off production time and adds **flexibility, simplicity** and **speed**. Walker says nothing he's used comes close to matching the speed he's found in Aura. **"Speed is a real issue when you're one person trying to make a real show... Aura is lightning fast!"**

Walker's animation, created in Aura, can be seen at
**http://www.studioartfx.com**
Read more about Aura at **http://www.newtek.com**

**Creativity without limits is yours with Aura**

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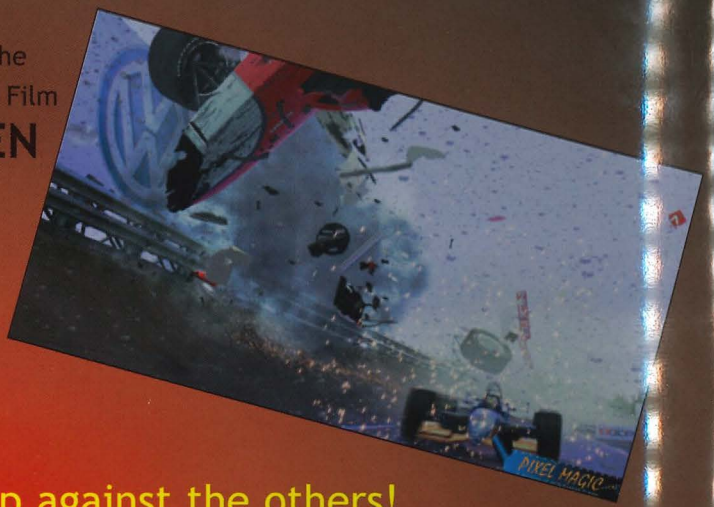
# NAPALM

## PARTICLE STORM 3

**LightWave's most powerful particle system just got better!!**

Used in the Blockbuster Film **DRIVEN**




### See how Napalm stacks up against the others!

| Features | LightWave's PFX | Particle Storm 2 Pro | Napalm/Particle Stonn 3 |
|---|---|---|---|
| Integrated into LightWave | Yes | No | Yes |
| Reacts to deformations, including Messiah & MD2K | No | No | Yes |
| Use polygons as particles | No | No | Yes |
| Remove a particle for a portion of scene | No | No | Yes |
| React and effect with Impact 2 objects | No | No | Yes, particles can affect impact objects |
| Force Fields, Drag | Yes, but only thru the Wind controller | Yes, Yes | Yes, Yes |
| Support for Weight Maps, Pick Maps, and Parts | No | No | Yes, throughout the program |
| Envelopable thru the Graph Editor | Yes, but only a few things | No | Yes, everything can be enveloped and controlled by channel modifiers |
| Can be controlled by expressions | Yes, but only a few things | No | Yes, everything can be tied to expressions |
| Gives the user godlike control over the particles | No | No | YES!!! |

Dynamic Realities

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For more information on Napalm or our other products, visit our web site at:

**www.dynamic-realities.com**